Brassey's Naval & Shipping Annual

1932

FORTY-THIRD YEAR OF PUBLICATION

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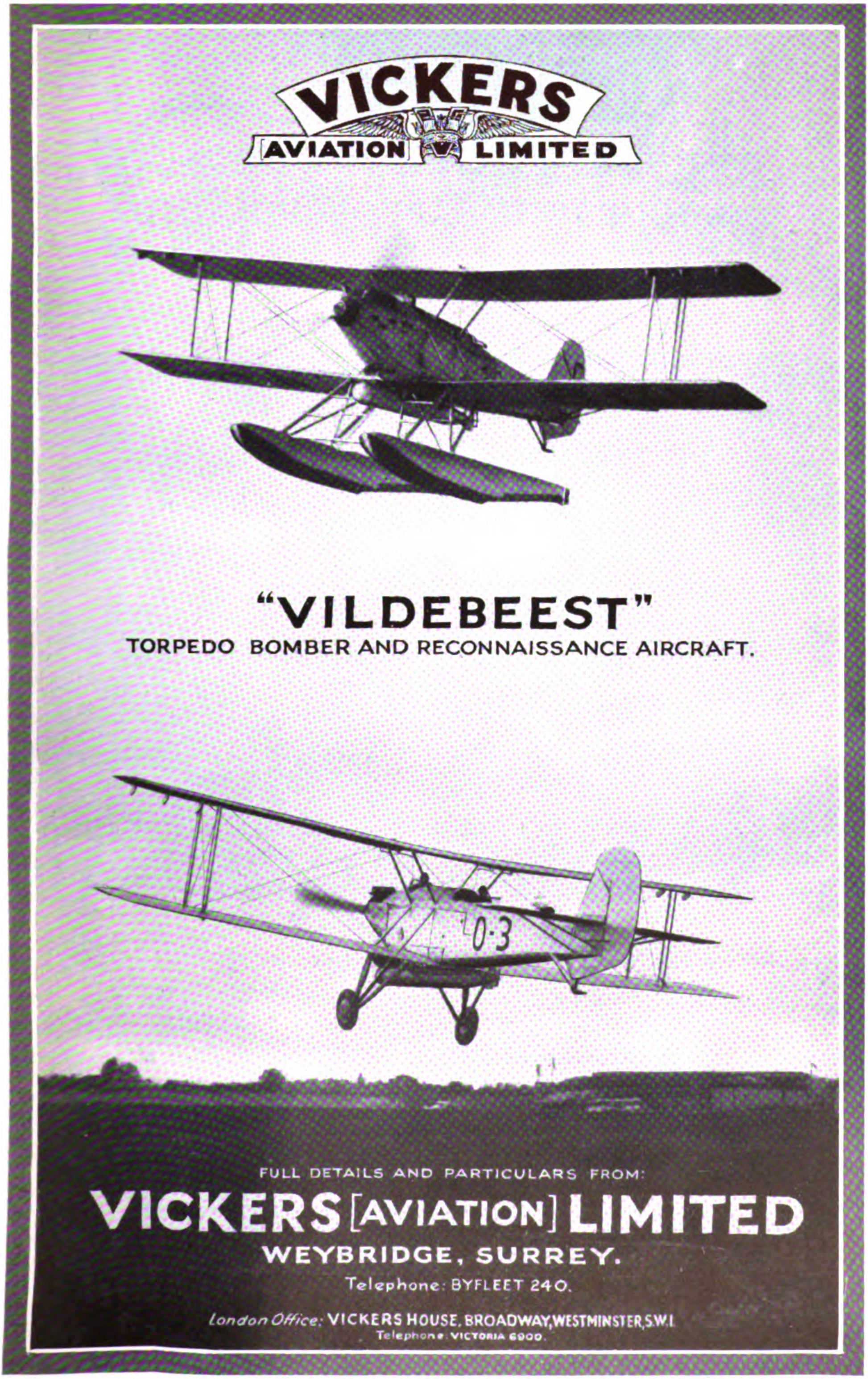
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BRASSEY'S

NAVAL AND SHIPPING ANNUAL.

1932.

EDITED BY

COMMANDER CHARLES N. ROBINSON, R.N.

AND

H. M. ROSS

FORTY-THIRD YEAR OF PUBLICATION.

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PREFACE.

THIS, the forty-third issue of "Brassey's Naval and Shipping Annual," appears on the eve of the International Conference on Disarmament at Geneva, which will be "the most momentous assembly," in the words of the Archbishop of Canterbury, to have taken place since the Peace Conference at the end of the War. Anticipation of this Conference has not been indicated in any general movement towards reductions in naval armaments. On the contrary, however much internationalists may proclaim that the old maxim, "If you wish for peace, prepare for war," is dead, the fact remains that all nations by their acts still indicate a large measure of faith in it. Security is their watchword, and so long as there is unrest in many parts of the world, the British Empire cannot afford to take further risks with the power by which it lives—its Sea Services. It has already, as the Archbishop has said, "made more substantial reductions than any other country; indeed, there are many who think that it has already reached the lowest point consistent with its safety and obligations." A depressed shipping industry is also a factor of weakness in this connection. While the outlook for the Merchant Navy is perhaps less gloomy than it was, it is still far from bright, and must continue for a time to be a matter of grave concern to an island Empire dependent for its existence upon seaborne supplies and the freedom of sea communications. Whatever the movements in national and international politics, there is one duty which is clearly defined, and it was that referred to by Mr. Churchill in concluding his speech when introducing the Navy Estimates in 1912. After referring to the growth of armaments as the grand folly of the twentieth century, he said :—

> The Admiralty must leave to others the task of mending the times in which we live, and confine themselves to the more limited and more simple duty of making quite sure that, whatever the times may be, our island and its people will come safely through them.

As in former years, "Brassey"—still the only publication of its kind in the world—provides not merely a forum where sea affairs are discussed by writers of authority, but also a work of reference for all concerned in the conduct, progress and efficiency of the war and merchant navies. In the "Summary" which follows there will be found an epitome of the facts and opinions put forward in the twenty special articles. A subject of growing importance which must be considered at the Conference is the air forces of the various nations. So far as the naval side of these forces is concerned, the "Annual" contains, for the first time, a concise account of the Fleet Air Arms of the four principal foreign Powers; and new tables of foreign marine aircraft types are included in the Naval Reference Section. Information not to be found elsewhere is thus

brought together, and may be compared with that relating to the British Fleet Air Arm in the 1931 edition. Other subjects of timely interest and importance concern the development of naval guns, and the need for maintaining the reserves of personnel, the latter by a new contributor to the "Annual," Mr. F. E. McMurtrie. Continuing the series begun last year with an essay on the R.N. Medical Service by Surgeon Rear-Admiral C. M. Beadnell, there is one on the Accountant Branch of the Royal Navy, by Paymaster Rear-Admiral A. C. Ransom. Former contributors again deal with the British and Foreign Navies, Comparative Strength, and the Limitation Treaties. Captain A. C. Dewar's analysis of the situation, "After the London Treaty," will be read with special attention.

In the Merchant Shipping Section light is thrown upon various phases of shipbuilding and shipowning. Attention may be particularly invited to the chapter on "The Costs of Ships," which reviews questions widely discussed of late in connection with the contracts for the new Cunarder and other vessels; and to that by Captain Watts, who describes the numerous contrivances which have now to engage the attention of the master of a modern ship. Mr. Cuthbert Maughan contributes a timely warning on the dangers of State-owned shipping; and a more personal note is touched by "Viator" in dealing with what may be called the domestic fashions of ships. Following the articles on the merchant fleets of Japan and Italy in the 1930 and 1931 issues, the present has one on the American Merchant Marine, by Dr. A. H. Haag, of Georgetown University, U.S.A. The two series on the great shipping companies and on British ports are continued with articles on the Cunard Line and the Port of Bristol. Fresh ground is broken by Captain F. J. Thompson, R.N.R., in a discussion on the training of officers for merchant ships. The Editor of *Flight*, in a survey of progress of marine aircraft, refers to improved types of flying boats now being produced, and to difficulties which tend to delay progress. Former contributors, whose work is again welcome, include Mr. J. P. Taylor and Mr. R. J. Butler.

In the Naval Reference Section, besides the new tables of foreign aircraft already mentioned, there will be found the important memorandum on the use of coal or oil as fuel for the Navy, issued by the Admiralty in July last. Mr. L. T. Carter, R.C.N.C., who has succeeded Mr. H. H. Palmer in charge of the Naval Reference Section, has furnished new plans of the British cruiser Leander, the foreign aircraft carriers Béarn, Hosho, Gotland and Lexington, and other vessels, as well as a number of profiles, including those of all the most important leader and destroyer types. The photographic illustrations include most of the latest war and mercantile vessels.

We again acknowledge with gratitude the courteous assistance of the Admiralty and foreign Navy Departments, the Naval Attachés of various countries, and the shipping and shipbuilding firms and other authorities whose co-operation in supplying or verifying information has been of great value.

THE EDITORS.

December, 1931.

SUMMARY OF CONTENTS.

THE progress of the Naval Forces of the British Empire during 1931 is dealt with in Chapter I. Even the limited amount of new construction allowed by Treaty tends to fall more into arrear, but the scrapping of old ships is in advance of Treaty schedules. There has been further retrenchment in personnel, from the Flag List downwards, but it is expected that with this pruning all officers who enter in future will have reasonable prospects of promotion to the higher ranks. The extension of facilities for advancement from the Lower Deck is described. Reductions in pay and allowances which are recorded show that there were other cuts during the year apart from those connected with the national emergency. Changes in the instructional establishments include the abolition of H.M.S. Fisgard after 25 years' duty as training ship for boy artificers. The Dominion Navies have been seriously affected by financial and economic difficulties, but two destroyers were completed for Canada.

Reviewing the progress of foreign navies, Captain Edward Altham, C.B., notes that while Great Britain is lagging more and more in her programme of replacements, France and Italy continue to build against each other navies which threaten to upset the whole balance of sea power in Europe. The disconcerting effect of the appearance of the Deutschland, the first of the new German capital ships, is also emphasised. A reorganisation of the United States Fleet in active commission is estimated to save 4,800 men, 120,000 tons in ships, and 11,000,000 dollars in cost.

In Chapter III, dealing with comparative strength, Mr. G. H. Hurford observes that Italian activity in cruiser construction during the past five years has now placed her definitely in the position of second strongest Power in Europe in this class of vessel. During 1932 six more British cruisers, completed early in the War, will reach their age limit; but no new cruiser is due for completion, and by the end of the year the number of cruisers under the age limit of 16 years allowed by the London Treaty will be only 43.

The Disarmament Conference which is to meet on February 2, 1932, will deal with problems which are surveyed by Captain Alfred Dewar in Chapter IV. So far as navies are concerned, he notes that a considerable degree of disarmament has been effected by all the principal Powers, and a large measure of agreement has been reached with regard to methods of measurement. It is rather in the sphere of land forces that acute differences of opinion may arise.

Following the inclusion in the 1931 "Annual" of a chapter by Surgeon Rear-Admiral C. M. Beadnell on the "Navy Medical Service," a somewhat similar essay is now published by Paymaster

Rear-Admiral A. C. Ransom on the "Accountant Branch of the Royal Navy," which he considers offers an attractive prospect to youngsters to whom a sea life and travel appeal. It affords an assured and responsible position with scope for useful individual activities.

An expert on naval ordnance describes in Chapter VI how in recent years the most marked feature in gun design has been the general introduction of designs permitting the repair of worn guns on board. But the United States has pursued an original line in making some small guns by auto-frettage from centrifugal castings.

The expansion of the existing Naval Reserves, by way of compensation for the steadily waning strength of the active service personnel, is advocated by Mr. F. E. McMurtrie in Chapter VII. He reviews the history of the various Reserves, and suggests that economy might be achieved by somewhat closer liaison between the R.N.R. and R.N.V.R. organisations.

In the last "Annual," the final chapter in the Naval Section dealt with the Fleet Air Arm of the Royal Navy. A complementary chapter appears in the present issue on the Fleet Air Arms of the United States, Japan, France and Italy.

Merchant Shipping Section.

Reviewing the standing of the world's merchant fleets, Mr. John P. Taylor, among other topics, analyses the amounts of tonnage effective for the carriage of general cargo possessed by the different maritime nations, and notes the growth of tanker tonnage and of tonnage relying on propulsion by oil, whether burned under boilers or used in internal combustion engines. Great Britain and Ireland now own only 29·4 per cent. of the world's tonnage, as against 41·6 per cent. in 1914, and 55 per cent. in 1897. Adverting to the peculiar conditions of 1931, Mr. Taylor affirms that what might have proved a wholesale breaking-up process was checked by the industrial slump which brought down the market value of scrap metal to a point where it did not pay to break up.

In a racy chapter, "Viator" shows that there are fashions in ships as in motor cars, and time lays a heavy hand on passenger tonnage. New ships are so very new that they make other ships look very old. The crowning achievement is the introduction of the 1,000 feet transatlantic liner, setting a new standard of travel and speed. The question of the disposal of old tonnage is also discussed, and the opinion is expressed that the process of elimination has been much too slow, and that the shipping business would be better and healthier for action on recognition of the fact that these lame ducks are a useless encumbrance on the oceans.

Mr. Cuthbert Maughan reviews the experience during and since the War with State-owned ships, particularly in Canada and Australia. After almost 10 years of operation there had not been a single year in which an operating profit had been shown by the Canadian Merchant Marine. The venture of the Australian Commonwealth in Government shipping also resulted in a loss of many millions

sterling. Yet there were candidates at the General Election advocating the transfer of shipping from private ownership to State control.

Dr. Alfred H. Haag contributes an informative chapter on the American Merchant Marine, in which he analyses the problem confronting the United States immediately after the War in the effort to establish, with an unbalanced fleet built during hostilities, a new business in a highly competitive field. Despite the losses sustained and the subsidies needed, Dr. Haag considers that the United States has benefited, directly and indirectly, by possessing its own merchant marine, and he gives examples of the advantages to the nation.

In the feature descriptive of the great British shipping lines, which was started in the last " Annual " with the P. and O. Company, the second article deals with the Cunard Line, which 92 years ago inaugurated the first regular steamship service between Europe and America. By 1925 the wastage of the War had been repaired by the addition of 200,000 tons of new shipping. The Company afterwards addressed itself to the problem of providing a successor to the Mauretania, and ordered the new 73,000 ton ship on the Clyde, the construction of which had unfortunately to be temporarily suspended on December 12, 1931.

The series on notable ports is continued with a chapter on Bristol, by the Chairman of its Port Authority. A brief historical survey is given, both of the development of facilities and of the port administration. Bristol owes her almost unrivalled distributive power to her geographical position; within a radius of one hundred miles of the city is a population of over ten millions, or one-fifth that of Great Britain.

A subject of much discussion recently is dealt with by Captain F. J. Thompson—the training of cadets for the Merchant Navy. He favours sea-going training ships, which should be operated by a joint body of shipowners, masters, underwriters and others, and subsidised by the State—a scheme on a national basis which should be capable of producing officers suitable for all types of ships in the Merchant Navy.

An article on " The Costs of Ships," by " Computator " throws light on a very important aspect of shipbuilding. The problem of estimating the cost of a new ship is very different from that of ascertaining the cost of standard articles of general consumption. With cargo ships, hull costs can be based on the amount of steel required for their construction, and machinery costs on the horse-power to be developed. But several factors enter into the design of larger passenger ships, and rates which hold for the tramp steamer cannot give any guidance for high-class work. One of the heaviest items in the cost estimate for new large vessels is that for the electrical services. In concluding his survey of the labour and costs involved, this writer pays a tribute to the skill and efficiency of the workmen concerned.

The customary review of progress in Mercantile Marine machinery is again contributed by Mr. R. J. Butler, M.I.N.A. He has to record a number of examples of the adoption of the turbo-electric drive, and

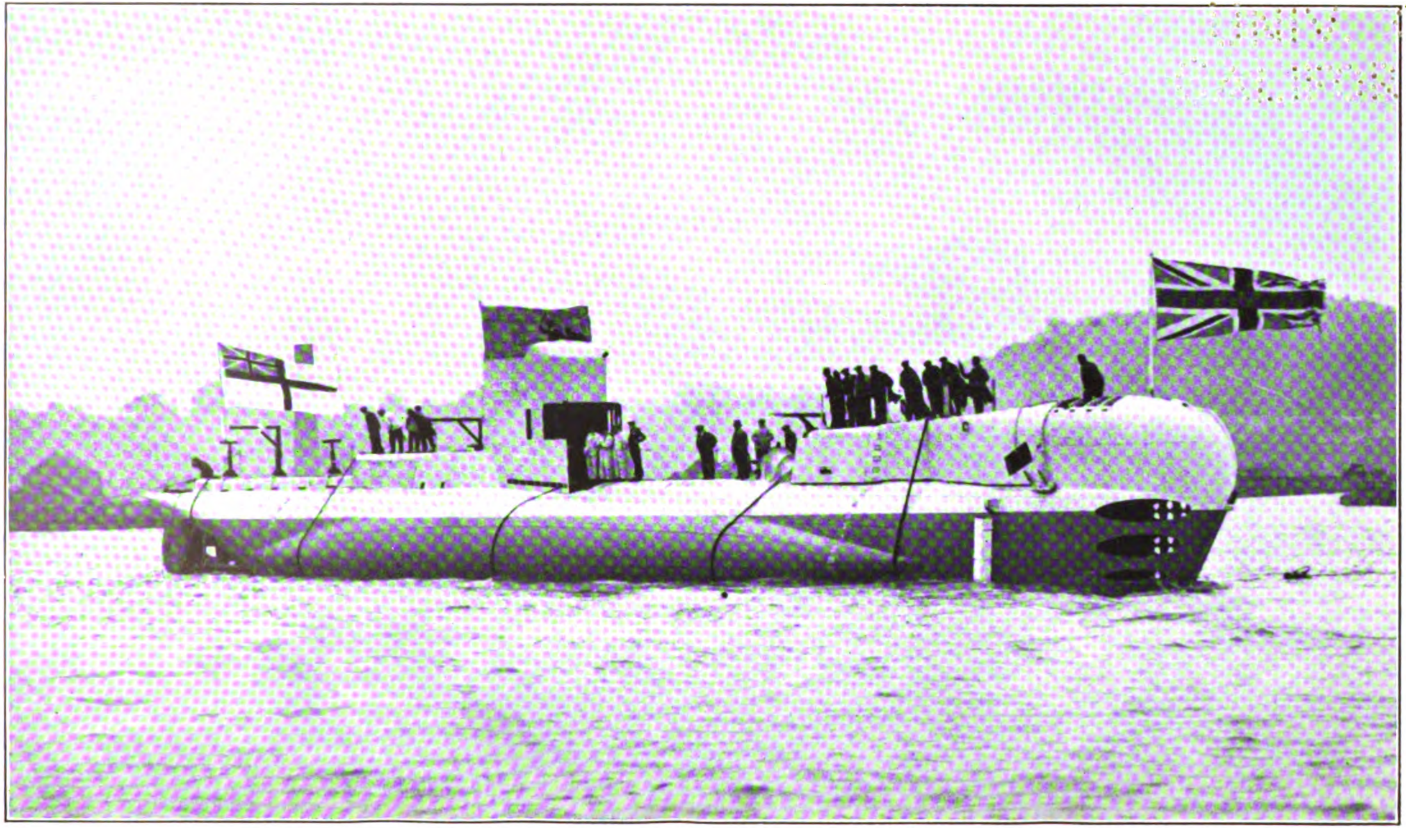
notes a revival, to a limited extent, of the popularity of the Diesel-electric system. The process of fitting exhaust turbines in ships driven by reciprocating engines was checked during the year by the prevailing depression. Internal combustion machinery maintained its popularity on routes where fuel oil is cheap, but there was a great falling off in the building of British motor tonnage.

The usual chapter on " Notable Merchant Ships of the Year " refers to the Rex, of 50,000 tons, for Italy, which was the largest vessel launched ; to the Canadian Pacific steamship Empress of Britain, the most remarkable vessel completed during the year ; and to several luxury liners of about 20,000 tons, some of them built in the United States.

" On the Bridge of a Liner " gives a conspectus of the mechanical appliances for aiding the navigation and operation of ships, such as are to be found in a first-class vessel. The writer, Captain O. M. Watts, while admitting the value of the gyro-compass, echo-sounding machine, range finder, submarine signalling, and other improvements, emphasises that they are of little avail if the human element fails.

The Editor of *Flight*, as in the last " Annual," deals with progress in commercial marine aircraft. He calls attention to the " Kent " class of flying boats built by Short Brothers for Imperial Airways ; the six-engined flying boat begun by the Supermarine Aviation Works in 1931 ; and the Saunders-Roe " Windhover " addition to the family of " Saro " flying boats produced by this Cowes firm.

NAVAL SECTION.



H.M. SUBMARINE SWORDFISH, 640 TONS.

Launched at Chatham Dockyard, November 10, 1931.

("The Times" photograph, copyright.)

CHAPTER I.

Naval Forces of the British Empire.

The year 1931 was disappointing in the influence of its events upon the well-being and potency of the Royal Navy. No progress was made towards arresting the decline in strength which, since the War, has been noted in successive issues of the "Naval Annual." While it seems almost impossible to reduce the Navy still further, yet until the outcome of the Disarmament Conference, called for February, 1932, is known, the position must be regarded with anxiety. It is not only that in numbers and in personnel the British Navy is being reduced, while other Powers are completing new ships and increasing the number of their officers and men. For some years to come also, this country must rely upon a growing proportion of obsolete tonnage, since new construction lags far behind the rate of wastage. There is time, indeed, to take steps towards rectifying this state of things, and with the advent of a strong National Government, even though pledged to economy, there is reason to hope that the opportunity will be taken. The Armaments Truce, which has been accepted for one year from November 1, 1931, by the Governments invited to the Disarmament Conference, does not preclude action in the direction of doing what is needed. Meantime, the facts and figures set forth in this issue of the "Naval Annual" indicate that the situation is one of increasing gravity.

Quite early in the past year it became apparent that the prospect held out by supporters of the London Treaty—that the example set by Great Britain, the United States, and Japan, in making sacrifices for an agreement, would be followed by other nations—was not going to materialise. On February 8, 1931, the late First Lord, Mr. Alexander, made certain significant admissions. Speaking at Newcastle on that date, he is reported to have said:

> You find a steady decline in our naval expenditure and a steady rise in almost every other country, and you begin to ask whether it is a sane policy. I do not want any lover of peace to think I am not in favour of further disarmament, but we can go too quickly unless we get other countries to go with us.

In another speech at Wolverhampton a little later, Mr. Alexander said that in the way of disarmament, somebody had got to start. He added: "This country did start; and what one found when one negotiated was this: that unless one was very careful the more one gave the less one got." There being grave doubts whether France and Italy could arrive at an agreement which would obviate the necessity for Great Britain invoking the escalator clause of the London Treaty, Mr. Alexander, in a speech at Bournemouth on

May 27, 1931, again deprecated this country taking the initiative in further reduction. "We have to face the fact," he said, "that you can never hope to obtain permanent peace by means of unilateral disarmament. It must be by all-round disarmament." Coming from one who was principally concerned in the negotiations which have resulted in the present situation, these admissions were notable.

It is doubtful, however, if the British people generally realised the bearing of all that was being done and promised in their name. As Sir Roger Keyes said at the Academy Banquet on May 2:

> We were a people slow to learn and quick to forget. We remembered our successes and victories, but we were so apt to forget the ever-recurring lessons of history, which recorded with unfailing regularity the humiliations and defeats which we suffered when our armed forces and maritime power were allowed to decline and decay because the political horizon was for the moment clear.

Similar views upon the one-sided disarmament which is so often advocated as the policy which this country should follow have been expressed by others, and among them Lord Lloyd. At the annual meeting of the Navy League in May, 1931, he said that at the present rate of building we shall not have 39 effective cruisers in four years' time, out of the 50 which our naval authorities have declared to be the minimum number essential for security. Such a course, he added, might easily lead to the biggest war yet known in history.

More recently, there has occurred the treatment by the League of Nations of the trouble in Manchuria, providing another lesson of the futility of relying upon moral strength alone to settle matters which touch a nation's vital interests. Rights and duties to her own subjects and to her own welfare must be the primary obligation of every self-respecting Power. The letter which Admiral of the Fleet Sir Arthur D. Fanshawe wrote to *The Times* on November 4, 1931, commenting upon the splendid response to the national appeal for unity and patriotism, assuredly deserves serious consideration. Sir Arthur wrote:

> May we not reasonably hope that this same spirit of patriotism and love of our Sovereign and our country may establish the great and paramount question of the security of the Empire upon a purely national footing apart entirely from, so to speak, parochial or political party interests?
>
> This security cannot be ours, in our unique position as a maritime Empire, without the maintenance of adequate power at sea to defend our scattered Dominions and our trade routes, upon which our vital necessities of sea-borne food and raw material absolutely depend. To us this is a dire necessity which no other nation in the world is called upon to face.

Perhaps the most ominous effect of the continuous reductions in the Fleet, and the circumstance that the British people have appeared to acquiesce in relinquishing their sea strength, seems to be the influence exerted by them in the Navy itself, with a consequent loss of contentment and zeal. It would not be surprising if the general morale of the Service had been somewhat shaken, and if its former buoyant tone of confidence had been sapped by the seeming indifference of the people. It has, indeed, been suggested that a spirit of pessimism is to be found in certain quarters, which to some extent may be responsible for the unfortunate disturbance at Invergordon. While the discipline of the Sea Service is as sound

as ever, and its loyalty to King and country is indisputable, yet it cannot be insensible to the degree of trust and regard extended to it by those whom it serves, nor fail to react to any weakening of the people's former trustfulness in the Royal Navy as their main bulwark of defence.

The following reference to the subject of the occurrences at Invergordon was made by the First Lord, Sir Bolton Eyres-Monsell, in the House of Commons on November 23, 1931 :—

I know what a shock it was to the whole country, but I beg the House of Commons and the country to understand that if it was a shock to them it was a most profound tragedy to the Royal Navy. The Navy realises that to-day we no longer occupy that very high position in the hearts of the British public that for centuries we have held. But of this I am convinced: it is the most earnest desire of every single officer and man to regain that position as soon as we possibly can. Personally, I am quite certain that that position can be regained. I think it can be regained soon, and it will be regained all the more quickly if the House of Commons and the country will leave the Navy alone to deal with its own domestic difficulties.

I.—THE BRITISH NAVY.

Cruiser Programmes.

With the completion of the Exeter in July, 1931, there remained in hand in various stages of construction the cruisers of two programmes, the Leander, of 1929, and the Achilles, Neptune, and Orion, of 1930. The Exeter was the last of the 8-inch gun ships allowed under the London Treaty. The four of the "Leander" class will be of about 7,000 tons, armed with 6-inch guns, the first British cruisers to be given a gun of this calibre as their main armament since the "Emerald" class was laid down in 1918.

The rate of construction tends to become slower, chiefly, no doubt, because of the lack of due financial provision. If three years was too long a period, and an uneconomical one, for the building of a 10,000-ton 8-inch gun cruiser, it is even more so for a 7,000-ton 6-inch gun cruiser, and two years would be ample. It is apparently the intention to complete the Leander in 2½ years, or by March, 1933. Owing to the large batches of "C" class cruisers which reach their age limit in the years immediately ahead, there is greater urgency than formerly for the early completion of cruisers in hand if the Fleet is to be kept fairly up-to-date and not burdened with a heavy quota of old ships.

For some two months after the completion of the Exeter there were only two cruisers actually in course of construction for the Royal Navy, both on the stocks. No vessel was in the fitting out stage. The Leander (1929 programme) was being got ready for launching at Devonport, and the Achilles (1930 programme) had just been laid down at Birkenhead. As a test of what should be a normal amount of cruiser building for the Royal Navy, it should be remembered that with a strength of 50 vessels, and an age limit of 20 years, replacement for wastage should proceed at an average rate of 2½ ships a year. As the ships take three years to build, there

ought always to be an average of 7½ ships in hand at any given moment—2½ just begun, 2½ at the launching stage, and 2½ approaching completion. It should further be remembered that replacements have got very much in arrear owing to no ships being laid down during the five years 1919–1923 inclusive, and in 1929.

Cruiser Programmes, 1927–1931.

The following table summarises the position in regard to the construction of cruisers for the Royal Navy under the programmes of the last five years :—

Programme.	Ships.	Tons.	Begun.	Remarks.
1927	Exeter	8,400	Aug., 1928	Completed, July, 1931.
1928	(*Surrey*) (*Northumberland*)	10,000	Ordered, 1929	Cancelled, January, 1930.
1929	Leander	7,000	Sept., 1930	Launched, Sept. 24, 1931
1930	Achilles Neptune Orion	7,000	June, 1931 Oct., 1931 Sept., 1931	On the stocks.
1931	3 ships		To be begun, 1932.	—

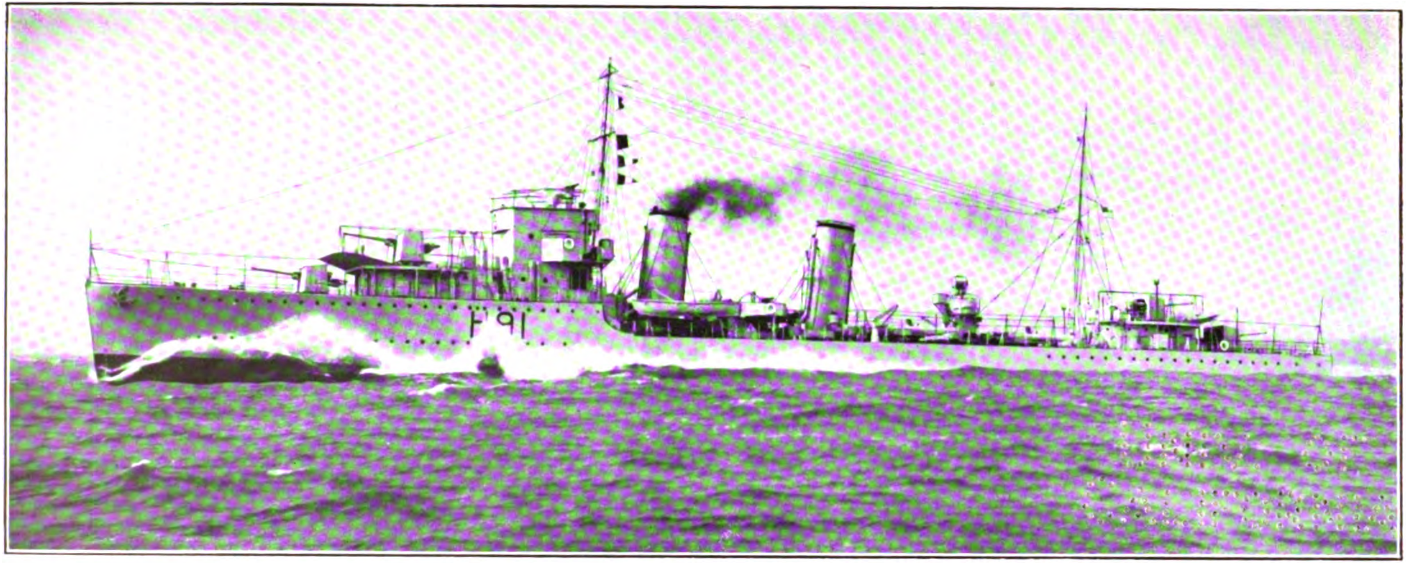
The Leander was launched at Devonport on September 24, 1931, the naming ceremony being performed by Mrs. Alexander, wife of the late First Lord. The Leander is the first of what may be a long series of 6-inch gun cruisers. With a displacement of 7,000 tons, she carries eight 6-inch guns in four twin turrets, with an anti-aircraft armament of four 4-inch guns. The torpedo armament is the same as in the "York" class, six 21-inch in triple sets. The machinery of the Leander is being manufactured by Vickers-Armstrongs, Ltd.

The 1930 Supplementary Navy Estimates included provision for three cruisers as the normal quota of building under the London Treaty. The contract for the Achilles, both hull and machinery, was awarded to Cammell Laird and Co., Ltd., Birkenhead, and her keel was laid by Prince George during a visit to the yard on June 11, 1931. The Orion was laid down at Devonport on September 26, after the launch of the Leander; and the Neptune at Portsmouth on October 3, 1931. Vickers-Armstrongs and the Parsons Company are providing the machinery for the Orion and Neptune respectively.

The three cruisers of the 1931 programme are to be built, two in the dockyards at Portsmouth and Chatham, and one by contract; but as only about £1,300 each for the dockyard vessels, and £15,000 for the contract ship, are included in the Estimates, they cannot be begun until well into 1932.

Capital Ships.

The position in regard to the necessity of heavy armoured ships in a modern fleet has not changed since the last "Annual." In a



[Photo by Frank and Sons, South Shields.

H.M. DESTROYER BULLDOG, 1,330 TONS.

Commissioned at Chatham, June 9, 1931.

(By courtesy of the builders, Swan, Hunter & Wigham Richardson.)

Fleet Order dated December 5, 1930, the Admiralty announced that it had been decided to re-introduce the term "capital ships" for use on any occasion when it is convenient to employ a generic title to include battleships and battle cruisers. The general opinion in regard to such vessels was that expressed by Admiral William Pratt, Chief of Naval Operations in the United States Navy, on March 31, 1931, after his return from the U.S. Fleet manœuvres off Panama. He expressed the view that surface vessels are still more formidable than aircraft, and his attachment to the 35,000-ton battleship is as strong as ever. Aviation cannot sink the battleship, he is reported to have said. "Bomb the biggest vessel from the air, and, when the smoke clears away, the ship will be fighting through. You cannot make a light-weight fighter take the place of the heavy-weight either in the ring or on the sea. Unless supported by surface strength no air force, however powerful, can halt the slow and steady advance of heavy ships."

The extent of the deferred liability caused by the London Treaty in this class of vessel was indicated by Captain Taprell Dorling, D.S.O., R.N., in an article in the *Nineteenth Century* for April, 1931. In his view, the Treaty has left unsolved the vital question of the replacement of our present capital ships. Under it we cannot begin to build before 1937. Allowing four years for design and construction, this means that no new capital ship can be completed, at the earliest, before 1940, by which time three of the ships of the "Queen Elizabeth" type will be 25 years old from the date of their completion. If we lay down only one new capital ship a year after 1936, and complete the first by 1940, the replacement of the 13 ships we possess (apart from the Nelson and Rodney) cannot be completed until 1952. The ages of the ships on relief would be between 25 and 34 years, reckoning from date of completion. If we possessed ships of this age now, the old battleships of the "Majestic" class, built in 1894–97, would still form part of our fighting fleet. The position is summed up by Captain Dorling as follows :—

It is extremely unlikely that the abolition of capital ships will be agreed to at any future Naval Conference, either by the United States, Japan, or by the responsible naval advisers to any British Government. This being the case, one of two things must happen. Either we must scrap the older vessels without replacement when they can no longer perform useful service, or else we must lay down more than one capital ship a year, starting in 1937. If we adopt the first alternative we shall not, for a period of ten years in the future, possess the fifteen vessels considered by responsible naval opinion to be necessary for our security. If, on the other hand, we decided to lay down more than one ship a year, we are still faced with the difficulty that no less than eleven of the existing vessels, completed in 1915 and 1916, reach the age of twenty-six years in 1941 and 1942, and all fall due for replacement in these two years.

Completion of the Acheron.

As regards torpedo craft, the principal event of 1931 was the completion of the Acheron, the first destroyer to be fitted with special machinery to make use of high-pressure steam, with a view to economy in fuel consumption. The Acheron was built and boilered by Messrs. Thornycroft and Co., at Woolston, as sub-contractors to the Parsons Marine Steam Turbine Company, which supplied

her propelling machinery. The boiler pressure is 500 lb. per square inch, with a steam temperature of 750 deg. F., as compared with 300 lb. per square inch and 600 deg. in the other destroyers of the "Acasta" group, built under the same year's programme. During her trials on the Clyde, the Acheron consumed 0·608 lb. per s.h.p. hour at full power, which was regarded as very creditable. Comparison on a fair basis between the Acheron and other vessels of the "A" class was hardly possible, as during the longer time occupied in her construction improvements had been made which were not available in the rest of the class. Had these been fitted to the other seven destroyers, their oil consumption might well have been lessened. A fairer comparison is between the Acheron and the eight of the "Beagle" class, completed about the same time, in which the average oil consumption was put at 0·73 lb. The Acheron was commissioned on October 14, 1931, to join the Atlantic Fleet as an additional destroyer.

Destroyers of 1928.

The flotilla leader Keith and the eight destroyers of the "Beagle" class, authorised in 1928, were commissioned at their various home ports in May and June, 1931, after the recall of the Broke and the "V" and "W" class destroyers of the Fourth Flotilla from the Mediterranean. They left Portland on July 18, and joined the flag of the Commander-in-Chief in the Mediterranean at Argostoli on August 5. The main features of the destroyers of this group are the same as those of the "Acasta" class. The propelling machinery, designed to develop 34,000 s.h.p., includes three boilers of the three-drum Admiralty type and two sets of single-geared turbines. The Basilisk and Beagle (built by John Brown and Co.) are fitted with Brown-Curtis turbines, and the remainder with Parsons turbines.

A change of design was approved in the case of the flotilla leader. Unlike earlier leaders, which were heavier and carried a more powerful armament than the destroyers with which they worked, the Keith was designed with the same dimensions and standard displacement as the destroyers of her flotilla, and to allow for the additional accommodation required for the flotilla staff and flagship duty she was to have only three 4·7-inch guns, instead of the four in the destroyers and the five in the last previous leader, the Codrington. Subsequently it was found possible to add one 4·7-inch gun, so that in main armament the Keith and the "Beagle" class destroyers are identical.

Thus the separate classification of the Keith as a leader is meaningless, for she is no different from a destroyer. The adoption of a smaller design is the more significant when compared with contemporary practice in the leading foreign navies. The United States has in hand one flotilla leader up to the limit of 1,850 tons and an armament of 5·1-inch guns allowed by the London Treaty. Italy has built a class of 12 leaders with a designed speed of 38 knots, the highest in the world, and with an armament of six 4·7-inch guns, besides smaller guns, torpedoes, and mines, on a displacement of 1,628 tons. France has built twelve leaders of the "Albatross"

class with a displacement of 2,440 tons, carrying five 5·5-inch guns. Such vessels, if built for the British Navy, would have to be classed as cruisers, but neither France nor Italy is bound by Part III of the London Treaty.

Destroyers of 1929.

All the vessels of the destroyer programme of 1929—reduced early in 1930 from one leader and eight destroyers to one leader and four destroyers—were launched in the autumn of 1931. The leader Kempenfelt, which is being built and engined by J. Samuel White and Co., East Cowes, was launched on October 29; the destroyers Cygnet and Crescent, built and engined by Vickers-Armstrongs, Ltd., Barrow-in-Furness, took the water on September 29; and the Crusader and Comet, built at Portsmouth Dockyard, with machinery by Hawthorn Leslie and Co., were floated out of dock on September 30, 1931. On the last-named date there was also floated out the Nightingale, mining tender, which was all ready for service, having been commissioned on September 10 as tender to the Vernon.

Destroyers of 1930.

The allocation of contracts under the 1930 programme was revealed by the First Lord, Mr. Alexander, in a speech at Dalton on December 13, 1930, when he said that it was proposed to divide up the work so as to give practically all the depressed areas some measure of it. The flotilla leader Duncan was to be built at Portsmouth, with machinery by Beardmore and Co., Dalmuir. The keel of the Duncan was laid without ceremony on October 3, 1931. Contracts for the eight destroyers were placed as follows, the firms concerned building both hull and machinery:—Defender and Diamond, Vickers-Armstrongs, Ltd., Barrow-in-Furness; Daring and Decoy, John I. Thornycroft and Co., Woolston; Dainty and Delight, Fairfield Shipbuilding Co., Ltd., Govan; and Diana and Duchess, Palmers' Shipbuilding Co., Jarrow-on-Tyne. The Dainty and Delight were laid down at Govan on April 20, and 22, 1931, respectively, and the other six at various dates up to October 1, 1931, when the keel of the Diamond was laid at the Barrow works of the Vickers-Armstrongs Company.

Destroyers of 1931.

The flotilla leader of the 1931 Estimates will be built at Portsmouth Dockyard, and the eight destroyers by contract. As only nominal sums (£328 for the flotilla leader and an even smaller amount for the eight destroyers) were set down in the Navy Estimates, the vessels cannot be begun until the summer of 1932.

Submarines.

On August 29, 1931, the submarines Orpheus and Phœnix arrived at Hong Kong to join the Fourth Flotilla, China Station, thus

completing the reconstitution of this force with post-War vessels. They belonged to the 1926 and 1927 programmes respectively, and had been delayed in completion.

Of the four submarines of the 1928 programme (reduced from six), the Rover left Portsmouth on August 15, 1931, for the Mediterranean, and the Regent and Regulus were ordered to follow her. The Rainbow, of this programme, was ordered to China to take the place of the lost Poseidon.

All the submarines of the "O," "P," and "R" groups are similar in design, with a displacement of 1,475 tons (2,040 tons submerged), and a length of 271 to 273 feet. On the surface their internal combustion engines of 4,400 h.p. give them a speed of 17½ knots; under water they are propelled by motors of 1,320 h.p., giving a speed of 9 knots. Each vessel carries one 4-inch gun and two smaller guns, with eight torpedo tubes.

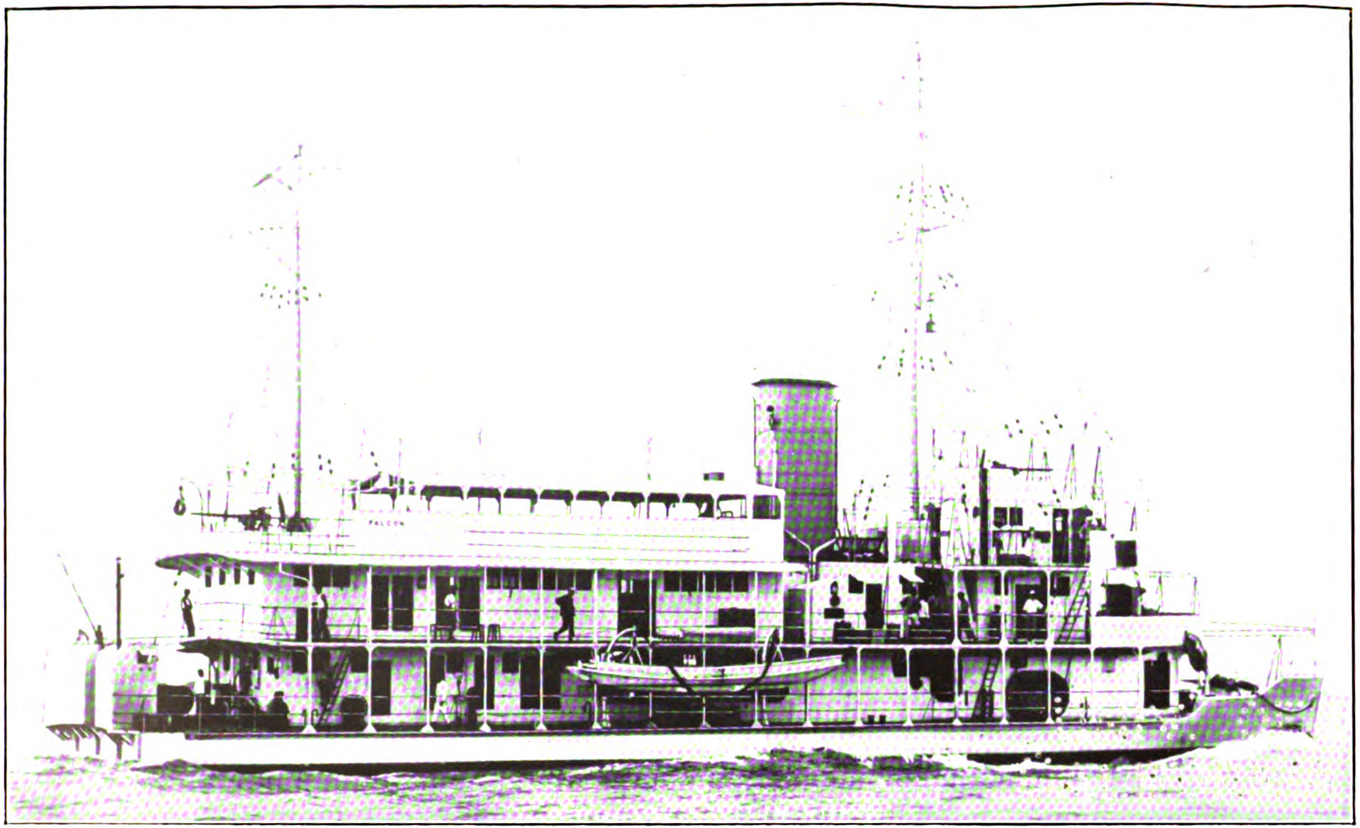
A new departure was made with the three submarines of the 1929 programme, one being of an ocean-going type and two of a smaller coastal type. The former is the Thames, building by Vickers-Armstrongs, and laid down in January, 1931. She is to be 325 ft. long, or over 50 ft. longer than the previous vessels, but will be of less breadth and draught (28 ft. and 14 ft. 4 in. respectively). The displacement will be 1,760 tons on the surface, and a 4·7-inch gun, instead of a 4-inch, will be mounted. The two small submarines of this programme are the Swordfish and Sturgeon, laid down at Chatham Dockyard in December, 1930, and January, 1931, respectively. They are to be of 640 tons, and will each mount one 3-inch gun. The Dockyard is providing the machinery as well as the hull of these vessels. The Swordfish was launched by Lady Tyrwhitt, wife of the Commander-in Chief at the Nore, on November 10, 1931.

Under the 1930 programme three more submarines are being built on similar lines to those of 1929. The contract for the large submarine Porpoise was awarded in June, 1931, to Vickers-Armstrongs, and the Starfish and Seahorse, of the small type, will be built and engined at Chatham Dockyard.

Under the 1931 programme three submarines are due to be built, but only one will be allocated to Chatham Dockyard, and two should be put out to contract. For the former £6,292 was included in the 1931 Estimates; and for the latter, £2,705 on each vessel.

New Sloops.

Four replacement sloops were sanctioned under the 1929 Navy Estimates as finally revised (a reduction from six), and as a contrast to the practice with the "Hastings" type of the previous year, two of which were built by contract, all four were allotted to the public dockyards, the Fowey and Bideford to Devonport and the Shoreham and Rochester to Chatham. The "Shoreham" class, as these ships are known, have a displacement of 1,105 tons, as compared with the 1,040 tons of the "Hastings" type, and are 265 ft. long, as against 250 ft.; 35 ft. in breadth, as against 34 ft. 1 in.; but of



H.M. RIVER GUNBOAT FALCON, 354 TONS.

Commissioned at Shanghai, September 30, 1931.

(*By courtesy of the builders, Yarrow and Co., Ltd.*)

lighter draught, viz. 8 ft. 3½ in. as compared with 9 ft. 1 in. The estimated horse-power, 2,000, and speed, 16 to 16½ knots, are identical in the two classes, but the "Shoreham" class has provision for ten tons more fuel at 290 tons. While the main armament is the same (one 4-inch and one 4-inch A.A. guns), the later vessels carry four instead of two 3-pounders.

The Fowey was laid down at Devonport on March 24, 1930, launched on November 4, 1930, and was commissioned on September 9, 1931, as an independent command for service in the Persian Gulf. She relieved the Folkestone at Colombo at the end of October, the Folkestone then proceeding to China to relieve the Magnolia, which was ordered home for scrapping. The Bideford was laid down on June 10, 1930, launched on April 1, 1931, and commissioned on November 26, 1931, to relieve the Hastings in the Persian Gulf, the Hastings being ordered to the Red Sea to replace the Dahlia, which was to come home for sale. The Shoreham was laid down in December, 1929, launched on November 22, 1930, and completed on October 26, 1931, to relieve the Penzance in the Persian Gulf, the Penzance then going to the Red Sea to replace the Lupin, which was withdrawn to reserve. The Rochester is not due for completion until March 31, 1932, and is to relieve the Cyclamen on the Africa Station.

The four replacement sloops of the 1930 programme are to be of the same type as the "Shoreham" class, and have been named the Falmouth, Milford, Weston-super-Mare, and Dundee. The Falmouth was laid down on August 31, and the Milford and Weston-super-Mare on September 14, all at Devonport; and the Dundee was laid down at Chatham later.

The Gunboat Falcon.

The gunboat Falcon, built by Yarrow and Co., and shipped to the Far East in sections, was reassembled by the Kiangnan Dock and Engineering Co., and launched on May 18, 1931, at Whangpoo, Shanghai. She was named by Mrs. J. F. Brenan, wife of the British Consul-General. Her trials were carried out by the crew of the Teal, one of the two gunboats which she replaces in the Yangtse.

The Falcon differs in many ways from her consorts, and has an extra deck providing more extensive accommodation. Her machinery consists of two Parsons turbines giving a collective S.H.P. of 2,250, and two Yarrow boilers each having a generating surface of 2,500 sq. ft. A complete installation of auxiliaries is provided in accordance with modern practice, and searchlights, electric lighting, ventilation and wireless services are supplied with current from either steam or Diesel generating sets. The armament includes one 3·7-inch Howitzer, two 6-pounders, and an equipment of Lewis guns. Quarters are provided for two officers and a crew of 61; the European members have entirely separate accommodation. The high superstructure, with battery deck at maximum level above the water-line, is a feature of the design, intended to ensure the best fighting qualities in narrow stretches between high banks of the river.

New Mooring Vessel.

The 1930 programme contained provision for a new boom defence or mooring vessel, of 260 tons, with a length of 93 ft., breadth of 25 ft., and mean draught of 7 ft. 10 ins. The contract for this ship was awarded in March, 1931, to Messrs. Bow, M'Lachlan and Co., Ltd., of Paisley, and she will be named H.M. gate vessel Moorgate.

Fishery Survey Vessel.

The surveying vessel Challenger, specially designed for purposes of fishery investigation, was floated out at Chatham Dockyard on June 1 by Miss Elizabeth Addison, daughter of the then Minister for Agriculture and Fisheries. It had been intended that the Challenger should make her first voyage in the extensive belt between the coast of Greenland and the island of Novaya Zemlya, but after the financial crisis in August it was decided that the undertaking must be suspended, and the Challenger was completed at the end of October as an ordinary surveying ship. She has a cruising radius of about 10,000 miles without refuelling.

Ships Scrapped.

No time was lost by the Admiralty in carrying out the provisions of the London Treaty regarding the scrapping of capital ships. The Treaty required two of the five ships for disposal to be "rendered unfit for warlike service" within twelve months from the coming into force of the Treaty (December 31, 1930), and to be "finally scrapped" within twenty-four months from the coming into force of the Treaty. The first two ships to be given up were the Benbow and Emperor of India. The Benbow had been paid off into dockyard control at Devonport for repairs on June 7, 1929, a sum of £144,000 having been included in the 1929 Estimates for this work. She was placed on the sale list at Devonport in September, 1930, three months before the Treaty came into force. In March, 1931, she disappeared from the Navy List, having been sold to Metal Industries, Ltd., of Glasgow, for breaking up at Rosyth. She need not have been "rendered unfit for warlike service" until December, 1931, nor "finally scrapped" until December, 1932. The second ship scrapped, H.M.S. Emperor of India, had been flagship of Rear-Admiral George F. Hyde, Commanding the Training Squadron. She was paid off into dockyard control at Portsmouth on January 22, 1931, for preparation for sale. On April 30, 1931, Commander H. B. Jermain and other officers joined to prepare her for experimental firings on a small scale, to be carried out by H.M.S. Iron Duke, gunnery firing ship. After firing tests in June, the Emperor of India was grounded in shallow water off Bognor Regis, and remained fast for some weeks. A record of the salvage of the ship will be found in the Journal of

the Royal United Service Institution for November, 1931, by Lieutenant H. E. Guerrier, R.N.

In the case of the third and fourth ships to be disposed of, an additional period of six months was allowed, both for rendering unfit and for final scrapping, the dates being June 30, 1932, and June 30, 1933, respectively. The ships concerned were the Marlborough and the Tiger. The Marlborough had taken over duty as flagship of the Training Squadron from the Emperor of India. The flag of Rear-Admiral Hyde was struck at Devonport at sunset on May 5, 1931, and the Marlborough recommissioned next day with a special complement for experiments with explosives.

The Tiger was withdrawn from the Battle Cruiser Squadron on the departure of Atlantic Fleet ships from Devonport on April 28, 1931, and was recommissioned on May 15 for de-storing and passage to Rosyth. She arrived at Rosyth on July 22, and was paid off there on the 26th. With her there passed the last of the coal-burning battle-cruisers which took such a prominent part in the operations of the Grand Fleet during the War.

Cruisers and Small Craft.

Three cruisers have been struck off the effective list during the past year, the Calliope, Cleopatra, and Carysfort. The Calliope was transferred to dockyard control at Portsmouth, after duty with the Reserve Fleet there, on January 30, 1931; and the Cleopatra, of the Nore Reserve, was paid off into dockyard control at Chatham on March 18, 1931. Both vessels were struck out of the Navy List in the issue for July, 1931. The Carysfort served as the ship of the Senior Officer, Reserve Fleet, Devonport, until April 28, 1931, when she was paid off into dockyard control there.

The flotilla leader Grenville and nine destroyers were paid off for disposal during 1931. The destroyers were the Scythe, Tara, Tintagel, Tribune, Trinidad, Truant, Tourmaline, Turquoise, and Tuscan. All belonged to the "S" class, laid down in 1917–18. On May 20, 1931, it was notified that approval had been given for the Tuscan to be retained in maintenance reserve until 1932, and the Valhalla was ordered to be scrapped in 1931 in place of the Tuscan. The Valhalla was already in reserve at Chatham.

On the completion of the new gunboat Falcon, the river gunboats Teal and Widgeon were paid off after thirty years' useful service in the Yangtze. The Widgeon was paid off at Shanghai on July 10, and the Teal on August 1.

Submarine K.26, which was in material reserve at Malta, was ordered in March, 1931, to be prepared for sale. With her passing there disappeared the last of the steam-driven submarines from the Royal Navy. Designed to supply a War need, the "K" class vessels were a triumph of engineering skill and resource, and were able to attain in good weather a surface speed of 24 knots; but this rate soon fell off in any heavy seas, owing to the peculiar shape of a submarine and to the risk of shipping water down the funnels.

The Fleet Air Arm.

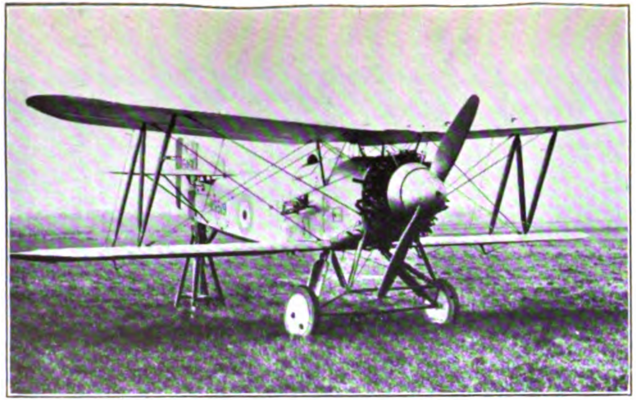
The work of the Fleet Air Arm was somewhat handicapped during 1931 by the fact that only one of the large carriers, H.M.S. Courageous, was employed at sea for the greater part of the year. H.M.S. Eagle was reduced to special complement for refit after her return from South America in the spring, where her aircraft did much to enhance the reputation of British aircraft by their demonstrations. H.M.S. Glorious sustained severe damage in collision during fog with the French liner Florida near Malaga on April 1, 1931, and had to undergo repairs at Gibraltar and Malta lasting until September. H.M.S. Furious had already been paid off for retubing at Devonport. H.M.S. Hermes continued her duties on the China Station.

An important development in the work of the Fleet Air Arm was the appointment, announced on August 4, of Rear-Admiral Reginald G. H. Henderson, C.B., to be Rear-Admiral Commanding Aircraft Carriers, to date September 21, on which date he hoisted his flag in the Courageous at Portsmouth. There had not been a flag officer in command of aircraft since Rear-Admiral Sir Richard Phillimore, who was Admiral Commanding Aircraft in the Grand Fleet, hauled down his flag in the Furious on the disbandment of that force in April, 1919.

During the year the new Hawker fighter, originally called the Hornet, and renamed the Fury for military use, made its appearance in the Fleet Air Arm. Its naval adaptation is known as the Nimrod. A Rolls-Royce Kestrel engine is fitted. During the quarter ended September, 1931, this machine replaced the "Flycatcher" type in No. 402 Flight at Gosport. The adaptation of the Hawker Hart bomber as a two-seater Fleet spotter reconnaissance machine is known as the Osprey, and this also made its appearance in certain units during 1931. The power unit in this case is a Rolls-Royce Kestrel engine. The Osprey can be used alternatively as land plane or float plane.

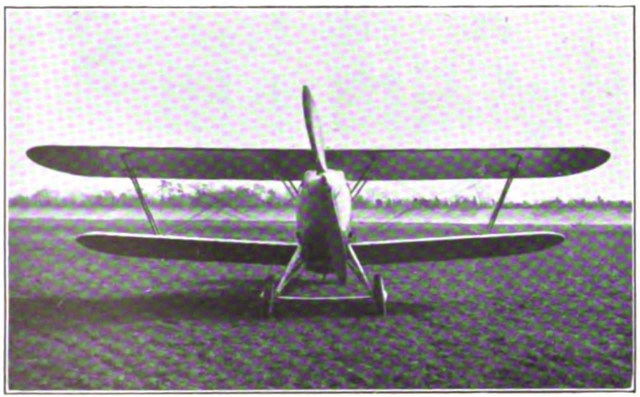
The Air Ministry system of classifying aircraft by means of type names, the initial letter of which shall denote the duties of the machines, has been started since the last issue of the "Annual." It provides that machines for Army co-operation shall have names beginning with "A," such as Atlas; Bombers (multiple-engined), names beginning with "B"; Troop carriers, "C"; Fighters (land), "F"; General purpose machines, "G"; Torpedo bombers, "M"; Fighters (Fleet), "N"; Fleet reconnaissance machines, "O"; Bombers (single-engined), "P"; Coastal reconnaissance machines and flying boats, "R"; Fleet spotter aeroplanes, "S"; and Training aeroplanes, "T."

In *The Times* on May 29, 1931, a special correspondent on board H.M.S. Courageous described a typical day's work on the part of an aircraft-carrier, from which the following details are taken. The flight deck is 108 ft. wide and 600 ft. long, with an approximate area of two acres. Nine Blackburn Darts of Nos. 463 and 464 (Fleet Torpedo Bomber) Flights were assembled at the after end. The



THE FAIREY "FLYCATCHER" FIGHTER.
Fairey Aviation Co., Ltd., Hayes, Middlesex.

THE FAIREY III. F SPOTTER RECONNAISSANCE AIRCRAFT.
Fairey Aviation Co., Ltd., Hayes, Middlesex.



THE "NIMROD" FLEET FIGHTER.
Hawker Engineering Co., Ltd., Kingston-on-Thames.

THE "OSPREY" SPOTTER RECONNAISSANCE AIRCRAFT.
Hawker Engineering Co., Ltd., Kingston-on-Thames.

Courageous steamed head to wind at a speed sufficient to produce a wind speed of 30 miles an hour. In rotation each of the nine machines flew ahead, passed over the bows of the ship, tilted over on one wing, and circled round to take station astern. When all were in the air and in formation the ship reduced speed, and later was attacked by the aircraft in three groups of three machines each. She increased speed and altered course to dodge the torpedoes which would have been fired had the attack been real. Later the bombers landed one by one and were lowered to the hangar below. In the afternoon the Flycatchers of Nos. 401 and 404 (Fleet Fighter) Flights and the Fairey III F.'s of No. 450 (Fleet Spotter Reconnaissance) Flight were brought up, until 15 machines were assembled at the after end of the flight deck. The fighters each carried four small bombs and 250 rounds of ammunition for their Vickers guns, and after taking off they formed an endless chain to starboard of the ship, diving down astern, one by one, to fire their guns and drop their bombs at targets thrown overboard. The correspondent adds :

> Then all aircraft landed one after the other, and the rapidity with which this was done was amazing to one to whom it was not a matter of daily routine. I was particularly impressed by the Flycatchers, which landed practically on the foremost lift and promptly disappeared below. I am informed that the record in this respect is six Flycatchers landed and sent below in 4 min. 26 sec. . . . The Courageous can accommodate 8½ flights, or 51 aircraft, at full stowage, but not all of these were on board to-day. Her total complement of officers and men is 1,283, of which 490 belong to the Fleet Air Arm.

Flag List Retrenchment.

A reduction in the active list of flag officers by the omission to promote captains in all the vacancies as they occurred was noted in the last "Annual." The Admiralty decided upon an eventual reduction in the number by eight rear-admirals. This was reached by April 3, 1931, when Rear-Admiral H. S. Monroe, D.S.O., was placed on the retired list, at his own request, and no promotion to rear-admiral was made. The strength of the rear-admirals' list, including supernumeraries, at this time stood at 39, as compared with 48 a year earlier. A further reduction of one was made on April 21, 1931, when no captain was promoted to rear-admiral in the vacancy caused by the promotion to vice-admiral of Rear-Admiral W. M. Kerr, C.B., C.B.E. The list of rear-admirals then stood at 38.

Retrenchment in the Australian Navy has also had its influence on the state of the Flag List in the Royal Navy. For some time, two flag officers have been lent to the Commonwealth Government, one for duty as First Naval Member of the Naval Board and the other in command of the Australian Squadron, and in accordance with the Orders in Council of February 13, 1912, and October 14, 1913, officers lent to the naval forces of the Dominions and to foreign governments are supernumerary to the established numbers. The decision not to appoint a flag officer to succeed Rear-Admiral E. R. G. R. Evans in command of the Australian Squadron, owing to the urgent need for economy, and the selection of an officer of the permanent Australian forces, Rear-Admiral G. F. Hyde, C.V.O.,

C.B.E., to succeed Vice-Admiral W. Munro Kerr, C.B., C.B.E., as First Naval Member, means a reduction of two in the number of officers allowed on the Flag List and in the number of vacancies for the advancement of captains.

Promotion after Retirement Withdrawn.

An Order in Council was published in the *London Gazette* on October 23, 1931, withdrawing the privilege of advancement in rank on or after retirement which had since 1870 been open to a large number of officers of the Royal Navy and Royal Marines. A Fleet Order on the subject, dated November 6, 1931, gave the following reasons for this step :

> Ultimately the grant of steps in rank on or after retirement, which was originally introduced to preserve rights and privileges appertaining to service on the Active List, developed into a system of reward or recognition of long and satisfactory service. Although this system, which does not exist in the Army or Air Force, may be said to have fulfilled a useful purpose in this respect, it nevertheless involves certain anomalies, particularly when in time of war or emergency it becomes necessary to recall retired officers to active service. Moreover, the holding by a very large proportion of retired officers of ranks in which they have rendered no service is open to the objection that it cannot fail to lower the prestige attached to such ranks. The Board have therefore decided . . . that the grant of steps in rank on or after retirement is undesirable in principle and should be discontinued, and that officers should retire in the rank held by them on the Active List.

It will be some years before the new rule comes into operation, as all officers, except captains on the executive list of seniority of 1926 and below, whether on the active or the retired list, are to retain any privilege of advancement applicable to the rank held by them on October 7, 1931.

Surplus Lieutenant-Commanders.

Further steps have been taken since the last issue of the " Annual " to reduce the substantial surplus which existed in senior lieutenants and lieutenants-commanders on the active list in the executive branch. But for the action taken, the surplus would have increased still further during the next two years, owing to a shortage of expected retirements. On February 2, 1931, details were published of a retirement scheme approved for executive lieutenants of seniority 1923, and executive lieutenant-commanders of seniorities 1923 to 1931, whose records had not been unsatisfactory. Officers *ex*-mate and *ex*-R.N.R. were included, but not supplementary officers or ex-warrant officers. Retirement will be in batches spread over about two years. The number of each seniority to be allowed to retire under this scheme will be limited to roughly one-sixth of the total number of that seniority. The first and largest batch of retirements under this scheme was to have been about 70 in number, and applications for inclusion were to reach the Admiralty by April 1, 1931, but on April 30 it was officially stated in the House of Commons that up to that date 45 officers had been permitted to retire under the scheme.

The 1927 and 1929 schemes of retirement for lieutenant-commanders concerned only officers over forty years of age. The 1931 scheme, on the other hand, was directed towards removing the surplus among younger and more junior officers. Whereas the older schemes concerned officers who were beyond the zone of promotion to commander and had, under ordinary circumstances, no further prospect of advancement, the new scheme included all seniorities within the zone. Earlier schemes cleared the top of the list somewhat, but did nothing to relieve the competition for promotion. The new step of offering special facilities to officers between 28 and 40 to retire was generally commended as more reasonable than those which offered such facilities only to officers over 40.

The 1931 scheme offered retired pay before the normal age at which it could be earned. Officers were allowed to go with retired pay as laid down in the non-service scale on page 44, section A2, of the Appendix to the Navy List, with an addition of £90 (standard rate) per annum, or £165 a year instead of £75 a year, with an addition of £7 10*s*. a year for each of the first six complete years of service, and an addition of £12 10*s*. a year for each complete year of service subsequent thereto, in the ranks of lieutenant and lieutenant-commander. In reckoning service, time on unemployed pay or half pay was counted as one-third.

Prospect of a Career.

This further retirement scheme gave rise, not unnaturally, to some apprehension among parents as to whether a boy who becomes an officer in the Royal Navy in present circumstances can look forward to this as his life's career. To clear away misconceptions, a statement of the position was made by the Admiralty on March 18, 1931. It was emphasised that the only officers affected by the retirement scheme are those entered during the War and in the years immediately preceding it. When this reduction has been carried out it is considered that, with the Fleet at its present strength, further retirement schemes will not be necessary. The rate of entry has been reduced, and it is expected that all officers entering in future will have reasonable prospects of promotion to the higher ranks. No special retirement scheme was required in the case of engineer officers, accountant officers, and Royal Marines. It is anticipated that they will continue as hitherto to enjoy satisfactory prospects of promotion to the higher ranks.

The Medical Branch.

The conditions of service in the Medical Branch of the Royal Navy formed the subject of a special article in the last issue of the "Annual," by Surgeon Rear-Admiral C. Marsh Beadnell, C.B. On June 8, 1931, it was announced that the Prime Minister had appointed a committee to investigate the causes of the shortage of officers and nurses in the Medical and Dental Branches of the three Defence Services, and to recommend by what means the situation

could be remedied. Sir Warren Fisher was appointed Chairman, and among the members were Surgeon Vice-Admiral Sir Arthur Gaskell, K.C.B., O.B.E., Medical Director-General of the Navy, and Sir Oswyn Murray, G.C.B., Secretary of the Admiralty.

Accelerated Promotion Discontinued.

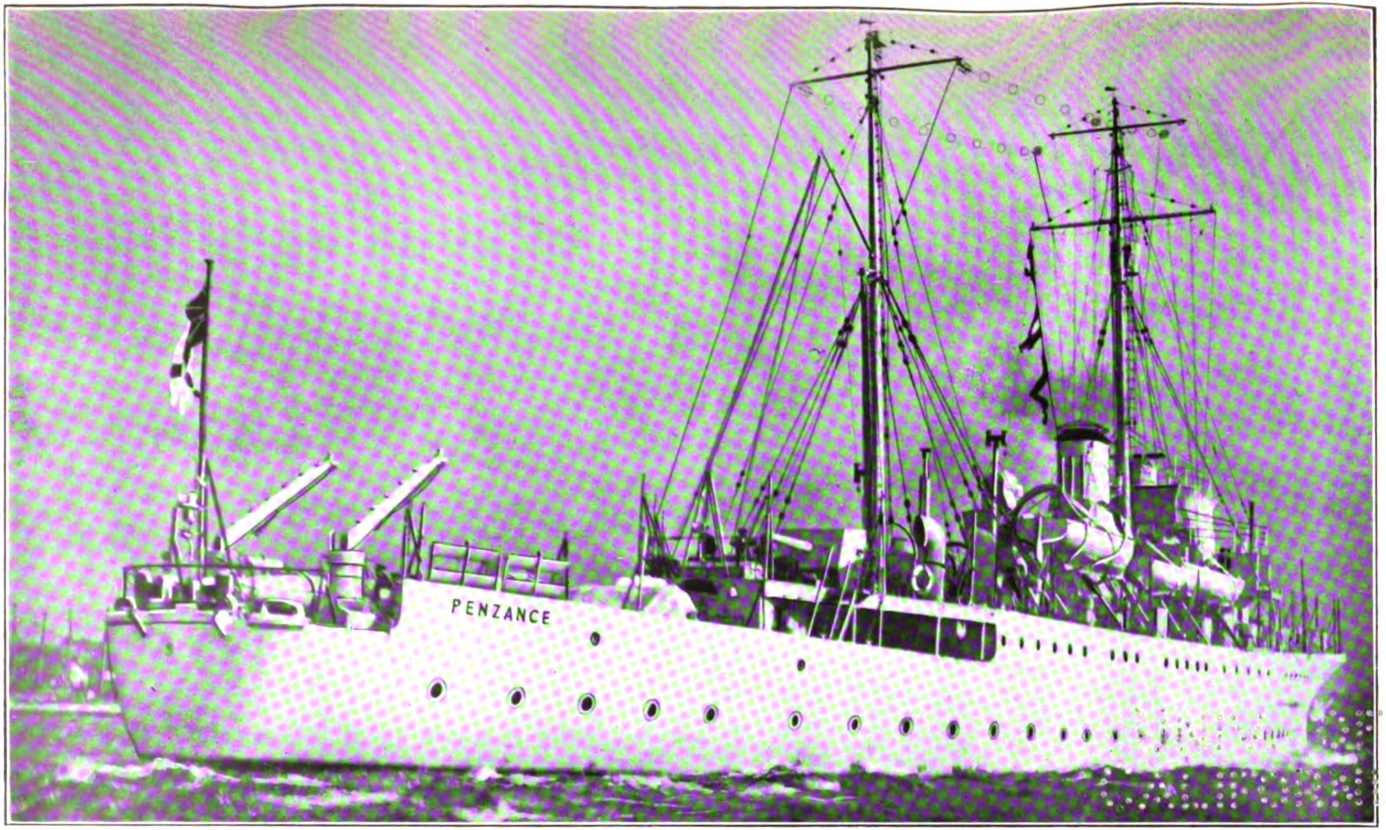
An announcement was made on December 5, 1930, that it had been decided to discontinue in all branches the arrangements laid down in Article 322, Clause 1 (*b*) and Appendix XII, Part 13, King's Regulations and Admiralty Instructions, for earlier promotion to lieutenant by selection after passing certain examinations. The abolition of this scheme in the signal boatswain and warrant shipwright branches was announced two years earlier (*see* the "Annual," 1930, p. 18). The number of lieutenants and above in the branches concerned will be maintained at a figure not exceeding 8 per cent. of the total number of officers in each branch by promotion for long and zealous service under the provisions of Article 322, Clause 1 (*a*), King's Regulations and Admiralty Instructions. Officers on the list of commissioned gunners, commissioned gunners (T), commissioned boatswains, commissioned engineers, and commissioned mechanicians at the date of the order are allowed up to January 1, 1934, to obtain the full qualifications for accelerated promotion, apart from sea service, and any officer so qualified by that date will be eligible for consideration for promotion upon completing the necessary three years' sea service as a commissioned officer from warrant rock. On January 2, 1931, there was announced the discontinuance of the scheme of accelerated promotion to lieutenant by examination of Royal Marine gunners, under similar conditions to those just mentioned.

Warrant Shipwrights, R.N.

It was announced in Fleet Orders on August 21, 1931, that, having regard to the fact that promotion to the rank of warrant shipwright had been suspended for a number of years, the Board had decided that alternative vacancies for this rank which arise owing to retirements for age may be filled until the present surplus is absorbed. No promotion had been made to this grade since June 14, 1928, when three candidates, one from each of the home ports, were advanced. Carpenters of the Navy had their title changed to warrant shipwright by Order in Council dated February 12, 1918. At the time of the armistice there were 109 commissioned shipwrights and 209 warrant shipwrights in the Navy List; but in the summer of 1931 the numbers were 88 commissioned shipwrights and 25 warrant shipwrights.

Lower Deck Promotion.

Announcement was made in the House of Commons on May 20, 1931, by Mr. Alexander of the decision of the Board of Admiralty on the recommendations of the Committee under Vice-Admiral



[Photo by Abrahams and Sons, Devonport.

H.M. SLOOP PENZANCE, 1,040 TONS.

Commissioned at Devonport, January 15, 1931.

Frank Larken, which had investigated the mate scheme of promotion from the lower deck to commissioned rank. It was decided to drop the title of mate and to promote selected candidates to the rank of acting sub-lieutenant and acting sub-lieutenant (E). The main drawbacks to the older scheme had been the somewhat high age at which promotion was achieved and the disparity in the qualifications on promotion between the mates and officers ex-cadet. The new scheme will, it is hoped, do a great deal to remove these disabilities for those who possess the qualities and application necessary to succeed. By a system of intense tuition, both in educational and professional subjects, in the early years of a young man's naval service, it will in future be possible for a candidate to reach commissioned rank in the Executive Branch at about the age of 21; at about 22 for engine-room artificers; and rather over 25 for stokers.

The time formerly spent at Greenwich by mates of the Executive Branch was three months only. In future there will be a preliminary course at the college of three months, followed by the full sub-lieutenant's course of six months. It is hoped by this extra time to enable those sub-lieutenants to compete successfully with other sub-lieutenants both in their examinations for lieutenant and subsequently in selection for specialisation. The candidates, at the end of the preliminary course, will join up with the ordinary acting sub-lieutenants for the two terms prescribed, and will undergo the same courses and pass the same examinations for the rank of lieutenant. On finishing their courses, they will be confirmed as sub-lieutenant, and will be sent to big ships, where, as in the past, they will join the wardroom mess.

A typical career for an officer promoted in future from the lower deck may be thus forecasted:—He enters Shotley or Gosport training establishment at 15½, goes to sea at 16½, and by showing exceptional promise in the training classes will be given special opportunities of rendering himself eligible for selection for a commission. He will be drafted to a capital ship or large cruiser only, and can be made an A.B. after 12 months as ordinary seaman instead of 15 months as formerly. Every encouragement will be given to him to pass for leading seaman, which he may do at 19½. After another year, or at 20½, if he has served satisfactorily as leading seaman, and is otherwise qualified, he may go before a Fleet selection board. All candidates recommended for commissions by these boards will subsequently be discharged to their depots and be assembled as a class at Devonport Barracks to go through a modified petty officers' course. Those not recommended for a commission will be confirmed as leading seamen if recommended by their commanding officer. On completion of this course, candidates will appear before a final selection board of naval officers at Devonport Barracks. Those who are selected by this Board will be appointed acting sub-lieutenants. The substitution of the rank of sub-lieutenant for that of mate was made in the Navy List in November, 1931.

Officers' Stewards and Cooks

Changes have been made during the past year in the organisation of officers' stewards and cooks. In Fleet Orders dated September 12, 1930, the announcement was made that it had been decided that in future the officers' stewards and cooks in H.M. ships and establishments were to be deemed part of the accountant branch, and were to be placed under the control of the accountant officer. Six months later, in his Notes accompanying the Navy Estimates, the First Lord stated that it had been decided to merge officers' cooks and ship's cook ratings into one branch to be called naval cooks. It is hoped that this amalgamation will simplify entry, training, and drafting of cook ratings.

The Order in Council creating a new Naval Cook Branch was published in the London Gazette on May 22, 1931, and it approved the establishment of the branch as from April 1, 1931. Provision was made for the immediate substitution of the new officer titles for those hitherto in use by the corresponding ranks of the existing establishment. The ratings are known as:—Assistant cook, cook, leading cook, petty officer cook, and chief petty officer cook. The warrant ranks and above are known as:—Warrant cook, commissioned cook, paymaster lieutenant (C), and paymaster lieutenant-commander (C). These titles replace those of warrant instructor in cookery, commissioned instructor in cookery, lieutenant instructor in cookery, and lieutenant-commander instructor in cookery. The rates of pay were similar to those already in force. Further details of the change were published in A.F.O. 1854, dated July 31, 1931.

Warrant rank was first granted to naval cooks in 1910, when the appointment of three Instructors in Cookery was authorised. In 1918 the first three officers to hold this rank were promoted to Commissioned Instructors in Cookery, and in 1920 the first of them was promoted to Lieutenant Instructor in Cookery.

The number of officers' stewards and cooks allowed in the retinues of Commanders-in-Chief afloat and certain other flag officers is now fixed, and does not depend on the rank of the holder of the post. The scale of ratings allowed was published in A.F.O. 3208/30.

Entry and Training.

The number to which the personnel of the Royal Navy is expected to fall by March 31, 1932, chiefly by natural wastage, is 91,840, the lowest since 1895. The reductions which are being made are almost entirely under Vote I, officers and men for the Fleet and general Service, very few falling under the other votes. The net reduction in personnel as between March, 1930, and March, 1931, was 3,400, which was made up of 3,050 officers, seamen, and boys for the Fleet, 330 in the Royal Marines, and the remainder in naval cadets and boys under training.

It should be pointed out that this retrenchment in personnel is entirely voluntary on the part of the Admiralty and the Government, and is in no way imposed by the international treaties. If there were

to be parity with the United States in numbers of personnel, it would be necessary to increase the vote by some 20,000, and if the ratio of 5 to 3 in comparison with Japan, which was adopted at Washington for capital ships, also applied to personnel, and the Japanese total was taken as the standard, it would be necessary to increase by nearly 50,000.

Training Squadron Abolished.

An unfortunate consequence of the retrenchment in capital ships agreed to at the London Conference is the abolition of the training squadron for boys, the Third Battle Squadron, formerly consisting of the Benbow, Emperor of India, and Marlborough. It had been hoped that the training of boys might be transferred to ships of the cruiser type in the Reserve Fleet, but there were no such vessels which could be spared for the purpose, as the cruisers, like the battleships, were in process of being reduced in numbers, and the total of 50 only allows of sufficient being allocated to the sea-going fleets and squadrons, with a small margin for reliefs, technical training, trooping, and ships under repair. For the present, boys after leaving the shore establishments will be trained in the ships of the sea-going squadrons. Their practical knowledge of seamanship will be limited until they have been some time in their ships, and to assist in their instruction on first going to sea additional petty officers have been sanctioned for battleships and cruisers in the Mediterranean.

Naval Recruiting.

The Navy Estimates of 1931 contained provision for 2,311 boys under training, as compared with 2,270 in the previous year, and the expenses of recruiting (£21,600) showed a rise of £600 due to increased requirements. In April, 1931, the Admiralty issued instructions to R.N. recruiting officers to limit the entry of boys to 25 a week. It was pointed out that only the best educated boys offering themselves should be recruited. The memorandum stated that from statistics it would appear that boys from technical schools reached the highest educational standards on entry, and this class of boy is specially required at the present time.

"Navy Week" Popularity.

There is no doubt that recruiting for the Navy is stimulated by the facilities given to the general public to gain a knowledge of the Service at first hand during "Navy Week." In 1931 this was held at the three home ports from August 1 to 8, inclusive, but omitting Sunday, August 2. There were 149,246 visitors at Portsmouth, or 11,678 more than in 1930; at Devonport the attendance was 75,763, as compared with 80,193 in 1930; and at Chatham, 91,497, as increase of nearly 20,000 on 1930.

The audited statement of the Navy Weeks' Charities Fund, 1930, published in Fleet Orders on February 27, 1931, showed that, including £623 16*s*. 2*d*. from the Excellent Centenary Tattoo, there

was an income of £16,763 16*s.* 9*d.* A sum of £12,540 4*s.* 8*d.* was devoted to men's charities through the R.N. Benevolent Trust; £3,123 8*s.* 1*d.* to officers' charities; and £120 to the Metropolitan and City Police Orphanage.

Reductions in Pay.

On September 12, 1931, the Admiralty communicated in Fleet Orders (No. 2,238 for Officers and No. 2,239 for ratings) the reductions in pay and allowances which had been decided upon in accordance with the Government's proposals for economy, to take effect on October 1, 1931. It was notified that, in view of the urgent need for economy in national expenditure, the rates of pay authorised for entries into the Service on or after October 5, 1925, were to be applied to all officers of the ranks affected, regardless of the date of entry into the Service. The ranks affected were those from acting sub-lieutenant to lieutenant after six years, inclusive, with equivalent grades in the engineer, accountant, instructor, and chaplain branches, and corresponding grades in the Royal Marines. The 1925 rates were from 1*s.* 6*d.* to 4*s.* a day less than the old standard rates approved in 1919. It was further notified that the rates of pay laid down for men who entered after October 4, 1925, were to be applicable to all those men who entered on or prior to that date. The 1925 rates were from 9*d.* to 1*s.* a day less than those approved in 1919, as for example, 7*s.* 6*d.* instead of 8*s.* 6*d.* a day for a chief petty officer, 6*s.* instead of 7*s.* for a petty officer, 3*s.* instead of 4*s.* for an A.B., and 2*s.* instead of 2*s.* 9*d.* for an ordinary seaman. The allowance in lieu of spirit (grog money) was to be credited from October 1 at the rate of 15*s.* a quarter, instead of 21*s.* a quarter as formerly, and for broken periods at 2*d.* instead of 3*d.* a day.

Two other economy measures, besides the adoption of the 1925 rates, were also approved. All standard rates of officers' full pay, unemployed pay, half pay, and retired pay were ordered to be reduced by 11 per cent., subject to the rounding off of odd amounts, instead of 8 per cent. as formerly. In future the rates are to be subject to review every six months, on April 1 and October 1, instead of every three years. Further, in accordance with a decision of the Government that there shall be a special reduction of pay on a graduated scale in the case of all State servants, including Ministers of the Crown, in receipt of pay of £2,000 a year or upwards, current rates of naval full pay and consolidated salaries of £2,000 a year or upwards were ordered to be reduced by 10 per cent. until further notice.

About 75 per cent. of the men serving in October, 1931, had entered before October, 1925. A large number had married at ages under 25, at which they were ineligible for the award of marriage allowance. There had been promises in 1924 and 1925 that men who had entered under the 1919 rates would continue to receive them during the whole period of their continuous service. The sudden and wholly unexpected withdrawal of this concession led to certain incidents in Atlantic Fleet ships at Invergordon. On September 15, 1931, the Admiralty announced that "the Senior

[*Photo by Abrahams and Sons, Devonport.*

H.M. CRUISER EXETER, 8,400 TONS.

Commissioned at Devonport, July 21, 1931.

Officer, Atlantic Fleet, had reported that the promulgation of the reduced rates of naval pay has led to unrest among a proportion of the lower ratings. In consequence of this he has deemed it desirable to suspend the programme of exercises of the Fleet and to recall the ships to harbour while investigations are being made into representations of the hardship occasioned by certain of the cuts in pay, in order that these may be reported for the consideration of the Board of Admiralty."

Inquiries at the Ports.

The Fleet left Invergordon on September 16 for its home ports, where investigations were made by the local Commanders-in-Chief, Admirals Sir Hubert Brand (Plymouth), Sir Reginald Tyrwhitt (the Nore), and Sir Arthur Waistell (Portsmouth). A conference between these officers and the First Sea Lord, Admiral Sir Frederick Field, took place at the Admiralty on September 18. Inquiries into cases of hardship began at the ports on Monday, September 21. References to the Invergordon affair were made in the House of Commons on September 16 and 17. On the latter date Sir Austen Chamberlain, the First Lord, replying to an appeal that for what had passed there should be no penalisation, said: "The past is past. It is in the interest of every one in the Navy or out of it to forget it. I am not going to look back. I am going to look forward, and I count confidently on the traditions of the Service and of the men of to-day loyally to uphold me."

In accordance with this promise, no disciplinary action was taken by the authorities in respect of the occurrences at Invergordon. But the Board of Admiralty later received information that since the return of the Atlantic Fleet to the home ports a few men who were serving in that Fleet had continued conduct subversive of discipline. On November 3, 1931, it was announced that after careful investigation the Board had directed that in 24 cases the men should be discharged from the Royal Navy, "services no longer required," On November 23, Sir B. M. Eyres-Monsell stated that this was a very old provision allowed by statute to the Admiralty and frequently used for getting from the Navy unsuitable men. There could be no appeal in these cases.

In the House of Commons on September 12 the Prime Minister, replying to questions, said that the Government had come to the conclusion that the simplest way of removing just grievances was to limit reductions as regards teachers, police, and the three defence Services to not more than 10 per cent.

On October 3, 1931, revised statements were issued in Fleet Orders (No. 2,409 for officers and No. 2,410 for men) cancelling those issued three weeks earlier and embodying the new rates of pay, with cuts of not more than 10 per cent. for those entered prior to 1925.

Admiral Sir Michael Hodges was absent from the Atlantic Fleet in hospital with pleurisy at the time when the first cuts in pay were announced. Rear-Admiral Wilfred Tomkinson was the Senior Officer of the Fleet at Invergordon, and a tribute to his tactful

handling of a difficult situation was paid by the First Lord in the House of Commons. On September 28 it was announced in the House that Sir Michael, in consequence of a report from his medical advisers that his complete recovery would take considerable time, had asked to be relieved of his command of the Atlantic Fleet. The Board of Admiralty, with great regret, had acceded to his request, and the King had approved the appointment of Admiral Sir John Kelly in his place. Sir John hoisted his flag in the Nelson at Portsmouth on October 6, and two days later the Fleet left for Rosyth to resume its exercise programme.

A Previous Reduction of Pay.

Before the crisis a reduction of 1 per cent. from the standard rates of officers' emoluments had taken effect on July 1, 1931. This was part of a reduction which should have taken effect a year earlier, but was deferred. The average of the cost of living index figures for the six months ended December 31, 1929, was under 65. Under the formula reproduced on page 3 of the Appendix to the Navy List, the rates of pay, retired pay, and the like ruling from July 1, 1930, to June 30, 1933, would approximately have been 92 per cent. of the standard rates, i.e., a reduction of 8 per cent. The Government in 1930 decided, however, that the reduction for the first twelve months of the triennial period, from July 1, 1930, to June 30, 1931, should be limited to 7 per cent. In view of the continued fall in the cost of living index figures, it was decided in February, 1931, that this modification of the formula could no longer be continued. The reduction from standard rates is therefore now 8 per cent., and this rate will be in force until June 30, 1933, as if no modification had been made in the normal arrangement in 1930.

There is still a strong feeling that the pay and retired pay of the naval officer should be stabilised, and not subject to these periodical revisions, which have always operated in a downward direction. The ground for such a desire is that the method of obtaining data for the calculation of the cost of living is inapplicable to the conditions under which the naval officer serves. The object of the figure is to give a standard of comparison of the cost of maintaining a working-class family before the War and since. Expenditure is grouped under five headings :—

1. Food—beef, mutton, bacon, fish, flour, etc.
2. Rent, including rates.
3. Clothing—men's suits and overcoats, underclothing, woollen and cotton materials, and boots.
4. Fuel and light—coal, gas, oil, candles, matches.
5. Other items, including soap, soda, domestic utensils, tobacco, fares, and newspapers.

Expenditure under these five headlines naturally looms large in the budgets of weekly wage earners, but not so prominently in those of officers of the Navy. On the other hand, charges for uniform, travelling, mess subscriptions, children's education, the upkeep of a separate establishment on shore, and the like, which are prominent

in the expenditure of those in the Service, find no representation, apparently, in the official formula.

Messing Allowance Reduced.

The revised issuing prices of Service provisions which came into force on April 1, 1931, were accompanied by reductions in mess, provision, and victualling allowances. Messing allowance was reduced from 8½*d.* to 8*d.* a day, victualling allowance from 1*s.* 3½*d.* to 1*s.* 3*d.* a day, and provision allowance as follows :—Officers, from 3*s.* 2*d.* or £51 a year to 3*s.* 1*d.* or £50 a year ; men (also long leave allowance), from 2*s.* 5*d.* to 2*s.* 3*d.* a day ; Shore Wireless Service, from 1*s.* 10*d.* to 1*s.* 9*d.* a day. A reduction of ½*d.* a day a head in the average daily cost of general messing was also ordered.

A second reduction was made with effect from October 1, 1931. Messing allowance was reduced to 7½*d.* a day, victualling allowance to 1*s.* 1½*d.* a day, Sunday dinner allowance from 3*d.* to 2¾*d.*, and provision allowance as follows :—Officers, to 2*s.* 11*d.* a day or £47 a year ; men (also long leave allowance), to 2*s.* 2*d.* a day ; and Shore Wireless Service, to 1*s.* 8*d.* a day. The average daily cost of general messing was ordered not to exceed 1*s.* 1½*d.* instead of 1*s.* 3*d.* per head for men, and 1*s.* 2⅞*d.* per head instead of 1*s.* 4½*d.* for boys under training.

Marriage Allowance Reduced.

The Government continues to withhold from naval officers a marriage allowance such as is paid to officers in the Army and Air Force, although men of all three Services are in receipt of such an allowance. For the financial year beginning April 1, 1931, marriage allowance is payable at the rates shown in the column headed " minimum scale 50 " in the relevant appendix to the King's Regulations. Formerly, it was paid on the minimum scale of 70. The payment for a wife only remained the same as 7*s.* a week. For a wife and one child the rate is 12*s.*, instead of 13*s.* ; wife and two children, 15*s.* instead of 17*s.* ; wife and three children, 17*s.* instead of 19*s.* ; wife and four children, 18*s.* instead of 20*s.* 6*d.* ; wife and five children, 19*s.* instead of 22*s.* ; wife and six children, 20*s.* instead of 23*s.* ; and then 1*s.* for each additional child, as in the former scale.

Increase for Physical Training.

In contrast to a number of reductions, approval has been given for the rates of non-substantive pay of naval ratings and marines qualified as physical and recreational training instructors, first and second class, to be increased by 3*d.* a day, with retrospective effect from August 2, 1930. The revised rates are :—Senior staff physical and recreational training instructor, 2*s.* a day ; staff P. and R.T.I., 1*s.* 6*d.* a day ; P. and R.T.I., first class, 1*s.* 3*d.* a day ; second class, 9*d.* a day. The first two of these four allowances are payable whilst holding the appointment.

The Tactical School.

A Fleet Order dated May 22, 1931, notified that the length of the Tactical Course has been increased from nine to ten weeks. The first of these courses began on May 5, 1930, at the Tactical School, Portsmouth. Three courses are held each year, and they are open to executive officers of the rank of commander and above. Attention has been called by the Admiralty to the facilities which exist at the Tactical School for the instruction of officers in problems connected with destroyer work. It is particularly desired that officers who have passed for command of destroyers, but who have not yet held such a command, should attend at the school during the periods when destroyer work is being specially dealt with.

The Navigation School.

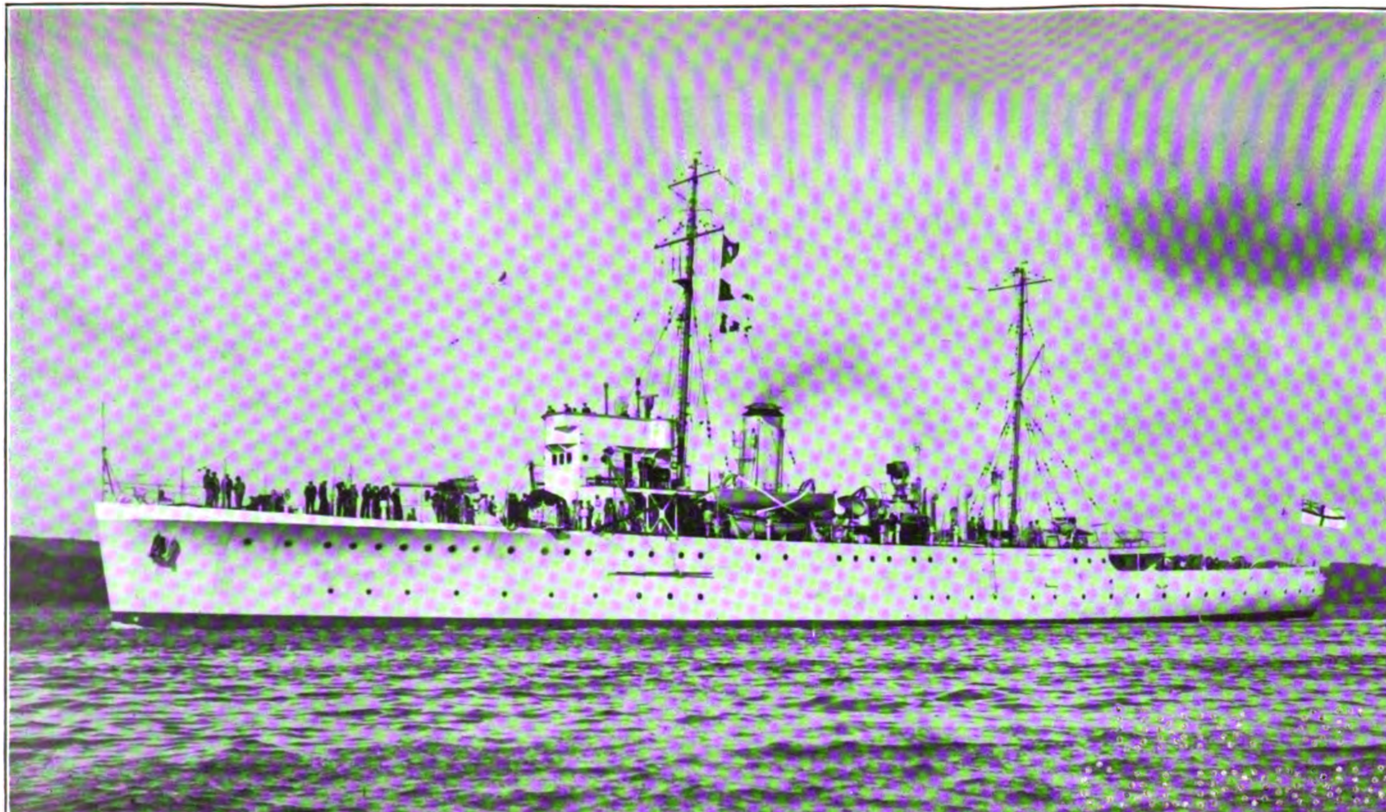
To commemorate the establishment by Order in Council, dated February 21, 1729, of the Royal Naval Academy in Portsmouth Dockyard, now the home of the Navigation School, a Bicentenary Fund was organised by Captain J. A. G. Troup, R.N., and certain improvements in the ante-room and mess at the School have been carried out as a result. There has also been obtained for the School a series of portraits of famous navigators, painted by D. M. Sutherland, A.R.S.A. A sum of £280 was raised, of which £152 was devoted to the purchase of the portraits, and after expenses had been met the balance of £122 was placed to the credit of the mess improvement fund.

Devonport Torpedo School.

One of the last of the harbour training establishments to be housed afloat is the Defiance, torpedo schoolship at Devonport. A reorganisation of this school took place early in 1931. It was formerly composed of the Defiance, late second rate, Defiance II., late Spartan, Defiance III., late Cleopatra, and Defiance IV., late Inconstant. The last-named was the only one of the old group retained. The others now forming the school are the late Andromeda, ex-cruiser, which up to March, 1929, formed part of the Impregnable establishment, and the late Vulcan, depot-ship from Portland. The administration of the Defiance establishment was transferred to the Andromeda at Milcove, Plymouth, on January 28, 1931, and the Defiance (old) was transferred to dockyard control at Devonport on February 6. The old Defiance was built at Pembroke in 1861.

Abolition of the Fisgard.

H.M.S. Fisgard, training establishment for artificer apprentices at Portsmouth since 1906, was ordered to be vacated at the end of December, 1931, and the work on board transferred to the new Mechanical Training Establishment at Chatham, where accommodation had been provided at a cost of about £195,000. The workshops on board the Fisgard had become inadequate and out of date.



[*Photo by Abrahams and Sons, Devonport.*

H.M. SLOOP FOWEY, 1,105 TONS.

Commissioned at Devonport, September 9, 1931.

The four hulks comprising the Fisgard at the time of her closing down were the Fisgard I, late cruiser Spartiate; Fisgard II, originally the broadside ironclad Hercules, and later the Calcutta; Fisgard III, late cruiser Terrible, which served during the Boer War and Boxer rebellion under Captain Percy Scott; and Fisgard IV, formerly the armour-clad Sultan.

Responsibility for Electrical Machinery.

Arrangements for the transfer of responsibility for electrical machinery from the torpedo officer to the engineer officer, which are in process of being carried out gradually, were introduced in March, 1931, in the following ships on recommissioning:—Cruisers Cornwall, Emerald, and Curlew. Alterations to complements (peace and war) provided for the reduction of A.B.'s (S.T.) and the addition of stokers trained in accordance with A.F.O. 2982/29. A similar transfer had already taken place in the battleships Nelson, Rodney, Malaya, Warspite, Queen Elizabeth, Revenge, Ramillies, and Royal Oak, and the battle-cruiser Renown.

Gyro-Compass Instruction.

On April 2, 1931, it was announced that the course of training in the care and maintenance of gyro-compasses had been reduced from six months to three months. Selected chief electrical artificers or senior electrical artificers are sent to the Admiralty Compass Observatory at Ditton Park, Slough, to undergo this course, and are afterwards allocated to the principal flagships, depot and repair ships, and the Vernon and Defiance, torpedo schools.

Petty Officers' Training.

Further changes have been made since the last issue of the "Annual" in the training and experience of the petty officers of the Navy. It has been decided that acting petty officers of the seaman, signal, telegraphist, and stoker branches shall, whenever possible, be transferred to other ships or establishments immediately on advancement to acting petty officer. Subject to the proviso that no rating undergoes the petty officers' course twice, the following arrangements are adhered to. For ships at home, every acting petty officer is discharged to depot immediately on advancement, and then put through the course. For ships abroad, each acting petty officer is, on advancement, exchanged with ratings of other ships on the station, and put through the course on return home.

Awards for Proficiency.

The first awards approved for naval personnel by the Admiralty Committee from the Lott Naval Efficiency Fund, inaugurated in 1930, were published in Fleet Orders on February 6, 1931. Commander A. Lockhart was awarded £200 for an invention concerning

Kingston valves for submarines, and there were ten other awards of from £100 to £5 for fire control and other appliances.

The second series of awards appeared in Fleet Orders dated July 31, 1931. Commander J. F. Hutchings, D.S.O., O.B.E., for control gear for submarine models, and Commander E. G. H. Bellars, R.N., for improvements to depression control gear for 16-inch gun mountings, were each granted £100, and there were six other awards varying from £35 to £5.

An addition to the awards offered to naval cadets was announced on March 27. The mother of the late Lieutenant E. W. Howard-Crockett, R.N., has offered a sum of money for the provision of a prize to perpetuate his memory. The Admiralty have accepted the offer on behalf of the Naval Service, and after consultation with the donor decided that eight awards, each consisting of books and/or instruments to the value of £2, should be made each year to naval cadets for qualities of leadership and good example. The awards will be made (*a*) to the two chief cadet captains passing out of the R.N. College, Dartmouth, each term; and (*b*) to the two best all-round special entry cadets passing out of H.M.S. Erebus each year, i.e., one each in July and December. The award is known as the "Eardley Howard-Crockett Prize." The first recipients were Chief Cadet Captains H. D. McLauchlan Slater and R. M. Favell, who passed out of Dartmouth College in March, 1931.

Warships' Libraries.

The libraries supplied to ships of the Fleet have been the subject of certain minor changes during the past year. On January 16, 1931, the decision was announced to supply to fully-manned destroyers the following books to form a small nucleus officers' reference library, to be built up later as circumstances permit: "Handy Reference Atlas" (Bartholomew), "Concise Oxford English Dictionary," Bellows' "French Dictionary," Jane's "Fighting Ships," and Jane's "All the World's Aircraft." The two last-named are to be one-year-old editions which become available from other ships when the new editions are supplied.

It was also decided about the same time to replace the 1922 edition of the "Admiralty Manual of Navigation," Volumes I and II, in the school reference libraries by the 1928 edition, and ships in possession of a school reference library were instructed to demand copies of the later edition.

The "Officers' Reference and Unit Library Catalogue" has been revised. Two copies have been issued to each ship entitled to maintain an Officers' Library. Several new books have been added to the Unit Libraries to replace books of which copies are no longer available. The scale on which the class of Officers' Library allowed to a ship is based has been revised as follows:—1st class, complements of 650 and over; 2nd class, of 300 and under 650; 3rd class, of 150 and under 300; and 4th class, of under 150.

Week-end Leave.

One of the general requests at the 1930 Welfare Conferences was that a cumulative system of leave be instituted in shore establishments for men whose homes do not permit of them making use of week-end leave, owing to distance and time. Their Lordships have approved of long week-end leave being extended in the case of men who live at such remote places that they cannot by any means return on Monday forenoon, to such an hour p.m. on Monday as the commanding officer may consider necessary. Such extension is not to be granted on an average more often than once in two months.

R.N. Massage Service.

The Royal Naval Massage Service was abolished as from May 31, 1930, together with the system under which naval sick berth ratings were trained in massage work at Chatham Hospital. Training in massage, medical gymnastics, and medical electricity will in future be carried out at a civil massage school, the normal length of the course being from 15 to 18 months. At the end of the course ratings will take the examination required by the Chartered Society of Massage and Medical Electricity.

Naval Uniform.

Only minor modifications have again to be recorded in regard to the uniform of naval officers and men. In November, 1930, it was notified in the *London Gazette* that, with the approval of the King, the star on the epaulette of a rear-admiral shall be 1¾ in. in diameter, instead of the former regulation which provided for a 2-in. star.

Other orders affecting uniform may be briefly summarised. On April 2, 1931, it was notified (A.F.O. 795/31) that in the conduct of religious services a chaplain may, if he please, wear a black silk scarf embroidered at each end with an anchor attached by its cable to a cross and surmounted by a Royal crown. Decorations and medals may be worn on the left side of the scarf when officers wear full dress or frock coat with epaulettes dress, and ribbons of decorations and medals when officers wear frock coat dress or undress.

Shirts with loose soft cuffs (either single or double) and links may be worn with undress, except on patrol, and with white undress on occasions (*e*), (*k*), (*l*) except on patrol, and (*m*) (A.F.O. 2505/30). Black mohair braid for the bands of blue cloth caps with peaks (Classes I and III) has been added to the list of seamen's clothing stocked in the victualling yards for issue on repayment at 5*d*. per yard (2866/30). On foreign stations the number of white drill tunics and trousers included in the kit of artificers dressed in Class III uniform may be increased to four of each, if ordered by the Commander-in-Chief, as already laid down for all other Class III ratings (2913/30). A black silk tie of superior quality has been introduced for issue on repayment to ratings dressed in Class I and Class III uniform, price 2*s*. (3055/30). Commanders-in-Chief on foreign

stations are authorised to include in the compulsory kit of men dressed as seamen cotton flannels of a white cotton material, but otherwise similar in pattern to the present Service flannel for wear during hot weather (778/31). Signal and telegraphist ratings serving in submarines are to be regarded as seamen class ratings for the purposes of the supply of submarine protective clothing and payment of submarine kit allowance.

In January, 1931, a committee was set up with Rear-Admiral W. F. French, C.M.G., as President, to consider various questions concerning the uniform of petty officers and men, as, for example, the fit and cut of garments, description of material used, and suitability of patterns. The committee was instructed to revise the uniform regulations, including any modification in the compulsory kits, particularly on foreign stations, which might be considered necessary. Members of the committee were :—Captain N. A. Wodehouse, R.N., Paymaster Commander G. A. Cooke, R.N., Mr. W. E. Clayton, O.B.E., Assistant Director of Victualling, and Mr. J. R. Tapp, M.B.E., Victualling Department, Secretary.

On August 21, 1931, it was announced that, to bring the practice concerning the dress of liberty men at the home ports into agreement, the instructions for the wearing of dresses Nos. 1 and 2, set out in the Uniform Regulations, were to be amended. The occasions on which they are to be worn are :—Dress No. 1—inspections ; musters ; ceremonial occasions ; Sundays in harbour and on leave, and when proceeding on long or week-end leave ; optional on leave on week-days. Dress No. 2—Sundays at sea ; optional on leave on week-days. Unless otherwise directed, duty men, duty boats' crews, and signalmen are to wear this dress when the rest of the ship's company are in No. 3 dress.

The following badges for naval ratings have been instituted since the last edition of the "Annual" was compiled :—Camera with star above for photographers, 1st class, and without star for photographers, 2nd class (2995/30) ; aeroplanes for telegraphist air gunners (2761/30) ; and a harpoon and coil, crossed by a streak of lightning, for submarine detector ratings (2570/30).

Welfare and Vocational Training.

The difficulties of the financial situation have operated against any concessions under the heading of welfare during the past year, such as might have been expected following the requests made at the 1930 Navy Welfare Conference. On September 25, 1931, it was notified in Fleet Orders, with reference to request No. 8, Group IV (Royal Marines), asking for cover for shelves for kit in R.M. barrack rooms, that Their Lordships had had under consideration the provision of kit lockers, "but in view of the pressing necessity for economy, this improvement cannot now be proceeded with."

The Navy, Army, and Air Force Institutions continue their beneficent work on behalf of the sailor. The sum of £7,600 was available for distribution in respect of surplus revenue accruing from naval canteen trading during the year ended November 1, 1930.

In accordance with the decision of the men of the Fleet, £3,040 of this sum (40 per cent.) was allocated to the R.N. Benevolent Trust, and £4,560 for distribution among the respective commands for the improvement of recreational facilities.

Good progress continues to be made by the vocational training schemes, although owing to smaller requirements the grant in aid of these from Navy funds was reduced from £8,000 to £7,250 in the 1931 Estimates. The engine-room artificers' course for the Board of Trade engineer's certificate had to be discontinued owing to the lack of candidates. It has been decided that fees for correspondence courses may be paid by allotment if so desired. A riggers' course was instituted early in 1931 at each of the home ports, to be conducted in the Dockyard. It was restricted to seamen ratings, who were to work under the orders of the Captain of the Dockyard and the Master Rigger, and to be attached for periods of about a fortnight to each of the gangs of riggers in the yard, as well as a fortnight with the Boatswain of the Yard to learn staging.

The Royal Marines.

One of the post-War disabilities under which the Royal Marine officers have laboured was removed by a Fleet Order dated April 10, 1931. Their Lordships had had under consideration the representations that had been received from the Fleet from time to time to the effect that disadvantage had been found to follow from the abrogation, under Articles 224 and 745, King's Regulations and Admiralty Instructions, of the special relative rank previously accorded to R.M. officers when embarked, in view of the later ages at which their promotion is obtained as compared with officers of other branches, and the nature of the duties allotted to them when serving afloat. Their Lordships decided to re-enact the arrangements in force on this subject prior to the regulations mentioned, so far as this could be done without infringing the general table of relative rank of officers of the Royal Navy, Army, and Royal Air Force. Accordingly, Royal Marine officers when embarked, that is to say, when borne on the books of one of H.M. ships, will rank as follows with officers of the Royal Navy, according to seniority or date of appointment, provided that they are not serving with either Army or Royal Air Force officers (other than naval officers attached to the Fleet Air Arm):—

Royal Marines.	Royal Navy.
Lieut.-Colonel, as from date of promotion to Major Major	Commander.
Captain Lieutenant } on completing 12 years from date of entry	Lieutenant-Commander.
Captain under 12 years from date of entry Lieutenant on completing 4 years from date of entry	Lieutenant.
Lieutenant under 4 years from date of entry	Sub-Lieutenant.

It was emphasised that this scale of relative ranks will affect Royal Marine officers only in relation to naval officers, and whenever R.M. officers are serving with Army or R.A.F. officers it will not apply.

II.—DOMINION NAVIES.

The development of the Dominion Navies has been checked, temporarily it may be hoped, by the economical difficulties from which all countries are suffering. The most interesting change of the year was the completion of two new destroyers for the Royal Canadian Navy to replace the two vessels of War design which had been lent to this Service. Heavy reductions had to be made in other Dominion forces, particularly in Australia.

Australia.

Rear-Admiral E. R. G. R. Evans, C.B., D.S.O., hauled down his flag in command of the Australian Squadron on May 29, 1931, when Captain L. Stanley Holbrook, M.V.O., commanding the cruiser Canberra, assumed command of the Squadron with the rank of Commodore, first class, and the Australia became a private ship.

On hauling down his flag in the Marlborough as Rear-Admiral Commanding the Third Battle Squadron, Royal Navy, on the abolition of this Squadron on May 5, 1931, Rear-Admiral G. F. Hyde, C.V.O., C.B.E., R.A.N., was appointed for special service at the Admiralty before returning to Australia in the autumn to become First Naval Member of the Commonwealth Naval Board in succession to Vice-Admiral W. Munro Kerr, C.B., C.B.E.

The Australian Fleet in commission consisted during 1931 of the cruisers Canberra and Australia, the aircraft carrier Albatross, and one flotilla leader or destroyer. The Anzac served as the ship of the Commander (D) until she was paid off on July 30, 1931, when her place was taken by the destroyer Tattoo.

New Zealand.

Captain F. Burges Watson, D.S.O., is to be lent to the New Zealand Government, dated February 26, 1932, as Commodore, second class, for duty as First Naval Member of the New Zealand Naval Board, and Commodore Commanding the New Zealand Station, in succession to Rear-Admiral Geoffrey Blake, C.B., D.S.O., who has held this post since September 9, 1929. Captain C. S. Thomson has also been lent to the New Zealand Government from January 1, 1932, for duty as Second Naval Member of the New Zealand Naval Board.

Among the special measures adopted in New Zealand to tide over the financial crisis is a levy at the rate of 20*s*. per annum, payable in 5*s*. quarterly instalments on August 1, November 1, February 1, and May 1 of each year. It was notified in Admiralty Fleet Orders on September 4, 1931, that all officers and ratings, whether New Zealand or on loan from other forces, are liable for this levy. In addition, all pay and allowances earned from August 1, 1931, by the personnel, and the value of victualling, are subject to a deduction of 1*d*. for every 6*s*. 8*d*. or part thereof.

The New Zealand Government decided in 1931 that future

H.M. CANADIAN DESTROYER SAGUENAY, 1,328 TONS.

Commissioned at Portsmouth, May 22, 1931.

(By courtesy of the builders, John I. Thornycroft and Co., Ltd.)

engagements or re-engagements of Royal Naval officers for service in the New Zealand Division of the Royal Navy will be at the same rates of pay, allowances, and conditions as those appertaining to the Imperial Service, and will be subject to any variations made by the Imperial Government during the period of service. New ratings lent to the New Zealand Division will be engaged at the present New Zealand rates of pay, less 10 per cent., but allowances for wives and dependants will be at Imperial rates, and other allowances at New Zealand rates, all subject to any variations made during the period of service, either by the Imperial Government or by H.M. Government in New Zealand.

The following reductions in the daily allowances for non-substantive ratings to New Zealand personnel are to take effect as from January 1, 1930:—Seaman gunner, from 4*d.* to 3*d.* a day; seaman torpedoman, from 4*d.* to 3*d.* a day; gunlayer, second class, from 8*d.* to 6*d.* a day; leading torpedoman, from 8*d.* to 6*d.* a day.

South Africa.

The minesweepers Sonneblom and Immortelle continued their useful work as training vessels for the South African Naval Service during the year, and co-operated on occasion with the surveying vessel Protea in hydrographic work such as the search in September, 1931, for an alleged rock in the neighbourhood of Cape Agulhas which was reputed to be a danger to navigation. Good work is also being done by the training ship General Botha. At an inspection of the ship by the Earl of Clarendon, Governor-General, on May 12, 1931, His Excellency recalled that the ship was started in 1922, and since then a large number of boys had been drafted to the Royal Navy, the South African Naval Service, and the Maritime Service.

India.

The organisation and training of the Royal Indian Marine made further progress during 1931 under the direction of Rear-Admiral Humphrey T. Walwyn, who became Flag Officer Commanding in 1928. The following vessels carried out a programme of cruising during the summer months of 1931:—Sloops Clive, Cornwallis, Hindustan, and Lawrence, and patrol boat Pathan. The Rear-Admiral Commanding embarked in the Clive at Madras for part of this cruise.

III.—THE YEAR'S EVENTS.

Loss of the Poseidon.

The submarine Poseidon was rammed and sunk on June 9, 1931, 21 miles north of Wei-Hai-Wei, by the Chinese coasting steamer Yuta, during foggy weather. She was operating on the surface at the time, in full buoyancy. Her 5 officers and 26 of the ratings on board were saved. Twenty ratings lost their lives. The majority of the crew were able to escape by the conning tower hatch. Six

made good their escape from the fore part by means of the Davis submarine escape apparatus, but two unfortunately died from the effects of their ordeal. Those who survived of this party owed their lives in large measure to the resource and courage of Petty Officer Patrick Henry Willis, who closed the watertight door of the compartment with the men inside, ordered the men to put on their escape apparatus, and then slowly flooded the compartment, keeping the party in good heart during the three hours in the darkness which elapsed before all could come to the surface. Willis was specially promoted to Chief Petty Officer and awarded the Albert Medal in gold. Leading Seaman Reginald T. Clarke was promoted to Petty Officer, and Able Seamen Vincent Nagle and Edmund G. Holt to Leading Seamen. The two last-named were also awarded the Medal of the Order of the British Empire, Military Division.

Other Mishaps.

The sloop Petersfield, Commander D. C. Lang, while on passage from Shanghai to Foochow, with the Commander-in-Chief, Admiral Sir W. A. Howard Kelly, on board, ran ashore on the north side of Tung Yung Island, some sixty miles north-east of Foochow, on Wednesday, November 11, 1931. Every one on board was saved, but the ship had to be abandoned as she was breaking up, and there was no hope of salvage. The crew were rescued by the German steamer Derfflinger.

The aircraft-carrier Glorious, Captain C. E. Kennedy-Purvis, was in collision on April 1, 1931, during fog, with the French liner Florida about sixty miles east of Gibraltar and thirty miles south-east of Malaga. The Florida was homeward bound from Buenos Aires to Marseilles. She was badly holed at a point where the steerage and third-class passengers were accommodated, and about thirty civilian lives were lost. One seaman in the Glorious was killed, and another injured. Aircraft from the ship were up at the time of the collision, and were warned not to return to the ship. Most of them landed at Malaga, but four were lost; there were no casualties among their personnel.

Other Events of the Year.

The aircraft-carrier Eagle, Captain H. E. Dannreuther, D.S.O., made a special cruise to South America in the spring of 1931 to co-operate in the functions connected with the British Industries Exhibition at Buenos Aires. At the time of the opening of the Exhibition on March 14, 1931, by the Prince of Wales, a British Squadron consisting of the cruisers Despatch (flying the flag of Vice-Admiral Vernon Haggard) and Danae, and the destroyer Achates (in attendance on the Eagle) was present in the harbour. President Uriburu and other distinguished guests visited H.M.S. Eagle, and displays of flying were given by air pilots from the ship.

A detachment of the Atlantic Fleet, composed of the Nelson and Rodney, the cruisers Hawkins, Norfolk, York and Dorsetshire,

and the minelayer Adventure, made a voyage to the West Indies as part of the spring cruise, in January and February, 1931. From February 23 to 28 the Nelson, flying the flag of Admiral Sir Michael Hodges, visited the United States Fleet at Balboa. The passage of the Nelson through the Panama Canal was an operation calling for much skill and judgment, as the Canal locks are 110 feet wide, and the beam of the Nelson, 106 feet.

Rear-Admiral E. A. Astley-Rushton, with the cruisers Dorsetshire and Norfolk, visited Kiel from July 4 to 11, 1931, on returning from the usual summer cruise to the Baltic. This was in response to an invitation from the German Government, and was the first visit of its kind since the War. It coincided with Kiel Regatta Week, and a ball was given at the Imperial Yacht Club.

The exercise programmes of the fleets and squadrons followed very much the lines of those in other years since the War. A combined strategical exercise between the Atlantic and Mediterranean Fleets took place in the Atlantic Ocean in the neighbourhood of the Straits of Gibraltar from March 14 to 18. On its conclusion, the two fleets remained together at Gibraltar until March 26, to discuss matters of training, policy and co-operation. The customary visits of Commanders-in-Chief to foreign naval ports during the year included United States, Japanese, French and Italian bases.

Prompt and effective aid was rendered by the New Zealand Division of the Royal Navy at the time of the earthquake in the North Island on February 2, 1931, in which the towns of Napier and Hastings were in great part destroyed. An account of the Navy's work, by an officer present, will be found in the *Marine Magazine*, the journal of the Marine Society (training ship Warspite) for November, 1931. Following the destruction wrought by hurricane at Belize, Honduras, on September 10, the cruiser Danae and the sloop Scarborough proceeded there to render all possible assistance. On account of anti-British revolts in the island of Cyprus in October, 1931, the cruisers London, Shropshire and Colombo and the destroyers Acasta and Achates proceeded there on October 23, and remained until November 6.

The completion of the Official History of the Naval Operations of the War was achieved on June 25, 1931, by the publication of Volume V. The first three volumes were the work of Sir Julian Corbett, and the last two of Sir Henry Newbolt. A great loss to naval literature and research was sustained by the death, on February 10, 1931, of Mr. W. G. Perrin, O.B.E., the Admiralty Librarian, Secretary of the Navy Records Society, and a Trustee of the National Maritime Museum. Since his appointment as Librarian in April, 1908, Mr. Perrin had reorganised the Admiralty Library and added enormously to its value and utility.

CHAS. N. ROBINSON,
Commander, R.N.

CHAPTER II.

Foreign Navies.

In last year's "Annual" it was remarked that the restrictions imposed on the British Navy by the London Naval Treaty seemed likely to produce a serious situation in view of the continued expansion of the navies of foreign Powers who are not a party to the Treaty. During the past year the situation has become more rather than less serious; for while Britain is lagging more and more in her programme of replacements, France and Italy continue to build against each other navies which threaten to upset the whole balance of sea power in European waters.

Another event during 1931 must complicate the naval position when it is reviewed again by the Powers in 1935, even if it does not produce an impasse at the forthcoming Disarmament Conference. This was the launching of the first of Germany's new capital ships, the 10,000-ton battle-cruiser Deutschland, and the projected programme of three more of this class. This new design of warship is disconcerting to other continental Powers because they have nothing which can both overtake and stand up to the Deutschland. With their heavy armament and stout protection the German ships will completely outmatch the 10,000-ton cruisers, while their speed will be such that they will easily be able to avoid action with the present types of French and Italian battleships. Political obstruction and the pending Disarmament Conference alone have deterred the French Ministry of Marine from laying down a 22,000-ton capital ship. Whatever the outcome of that Conference, it is unlikely that Germany will agree to scrap the ship which is regarded as marking the re-birth of her sea power; and if the Deutschland is completed, France will feel compelled to build in order to cover the hole in her armour. In view of the insuperable difficulties which have so far beset a Franco-Italian naval agreement, it would appear likely that Italy will also start building capital ships again; and, ultimately, this may react on British naval policy.

Thus we see that the limitations imposed on Germany by the Versailles Treaty have failed to eliminate her navy as a factor in international armaments.

There are favourable signs that British shipyards may come into their own again as the finest builders of warships in the world. Although of late years foreign orders have been regrettably few compared with pre-war times, those Powers who have recently taken delivery of British-built warships have had every reason to be satisfied with them, both from the point of view of design and workmanship. The same cannot be said of many of the cheaper and

TABLE "A."—WARSHIPS COMPLETED, BUILDING AND APPROPRIATED FOR DURING 1931.

NAVY.	Battle cruisers or coast-defence ships.	10,000-ton cruisers.	Smaller cruisers.	Cruiser mine-layers.	Aircraft carriers.	Flotilla leaders.	Destroyers.	Submarines.	Sloops.	Coastal motor-boats.	Gunboats and despatch vessels.	River gunboats.	Minesweepers and netlayers.
British Empire	..	..	5	..	..	3	23	9	9	..	..	1	..
United States	..	10	..	..	1	1	10	3	..	..	..	..	..
Japan	..	4	..	1	1	..	10	4	..	..	..	..	..
France	..	3	3	2	1	18	1	56	6	9	..	..	1
Italy	..	5	8	..	..	3	12	31	..	4	..	..	..
Germany	2	..	1	..	..	..	..	..	..	..	1*	..	..
Spain	..	2	..	..	..	4	..	..	..	..	..	..	..
Finland	2†	..	..	..	..	..	..	1	..	..	..	..	..
Greece	..	..	..	..	..	..	4	..	..	..	..	..	..
Netherlands	..	..	1	..	..	1	..	9	..	..	1	..	1
Norway	..	..	..	1	..	..	..	..	..	..	1	..	..
Poland	..	..	..	..	..	..	2	3	..	..	..	..	..
Portugal	..	..	..	..	1	..	4	2	4	..	2	..	..
Rumania	..	..	..	..	..	..	..	1	..	..	..	..	..
Soviet Union	..	..	..	..	..	..	..	3	..	..	..	..	..
Sweden	..	..	..	..	1‡	..	2	1	..	..	..	..	..
Turkey	..	..	..	..	..	..	4	2	..	3	..	..	..
Yugoslavia	..	..	..	..	..	1	..	..	..	..	..	..	..
Argentine	..	..	2	..	..	..	..	3	..	..	..	..	..
Brazil	..	..	..	..	..	..	..	..	..	..	..	1§	..
China	..	..	2	..	1	..	..	..	..	..	7	..	..
Persia	..	..	..	..	..	..	..	..	2	..	..	..	..
Total, exclusive of the British Empire	4	24	17	4	6	28	49	119	12	16	12	1	2

* Gunnery tender.
† Coast-defence ships of 4,000 tons, armed with four 10-in. guns each.
‡ Hangar-cruiser with catapults, but no landing deck.
§ River monitor of 450 tons, armed with two 4·7-in. guns.

more specious products of foreign yards, and there is good reason to believe that those navies who have not "bought British" are already beginning to repent their bargains. British designs may not be so attractive to young navies; the ships may seem unduly solid, slow and expensive; but they do not develop structural defects almost as soon as they are completed, for they are built to last and to stand wear and tear. Their trial speeds are their service speeds; they are not mere spectacular performances under favourable conditions and on light draught; performances which, incidentally, not infrequently overstrain machinery and which could not be repeated in war. All of this means that the British-built warship, if more expensive to buy, is by far the most efficient and, in the long run, the most economical.

TABLE "B."—FOREIGN SHIPS BUILDING, ORDERED OR COMPLETED DURING 1931 IN:—

Ordered by	Great Britain.		Italy.						France.		Japan.
	Sloops.	Flotilla leaders or destroyers.	Cruisers.	Sloops.	Aircraft transport.	Destroyers.	Submarines.	Motor launches.	Destroyers.	Submarines.	Small cruiser.
Argentine	..	..	2	..	..	..	3	..	..	..	..
China	..	..	..	..	..	..	..	..	..	..	1
Greece	..	..	..	..	..	4	..	..	..	..	..
Persia	..	..	..	2	..	..	..	4	..	..	..
Poland	..	..	..	..	..	..	..	..	2	4	..
Portugal	2	2	..	2	1	..	2	..	..	..	..
Rumania	..	..	..	..	..	..	1	..	..	..	..
Turkey	..	..	..	..	..	4	2	3	..	..	..
Yugoslavia	..	1	..	..	..	..	..	..	..	..	..
Total	2	3	2	4	1	8	8	7	2	4	1

UNITED STATES.

Naval Programme.

The Navy Department and "big navy" enthusiasts are much disappointed because the New Construction Bill for one 13,800-ton aircraft carrier, one 10,000-ton 6-inch gun cruiser-carrier, one 7,500-ton 6-inch gun cruiser, four submarines and a hundred and thirty aircraft failed to come up before Congress rose, whereby the necessary legislation could not be enacted before the end of 1931. Considerable efforts were made in the autumn to arouse public support for a new construction programme, but against this is a strong pacifist element invoking the claims of disarmament and the importance of doing

nothing to prejudice the Geneva Conference early in 1932, while an impending budget deficit will strengthen the demands for economy.

The Appropriations Bill for the fiscal year 1932 provides approximately £72,000,000, which is about £4,000,000 less than in 1931. Economies have been effected in operating expenses owing to the fleet being reduced under the re-organisation scheme, and in new construction already laid down, owing to a large unexpended balance from former appropriations; while the sum allocated for modernising battleships has been greatly reduced.

Re-organisation of the Fleet.

As from April 1, 1931, the naming and numbering of the major units of the fleet were re-organised; and, with a view to economy and increased efficiency, a number of obsolete ships have been withdrawn from active commission. The new organisation provides for four "Forces": the Battle Force, based in the Pacific; the Scouting Force, based in the Atlantic; the Submarine Force, with subdivisions operating from Pearl Harbour, San Diego, Coco Solo and New London; and the Base Force with one squadron in the Atlantic and another in the Pacific. It was originally intended that the 10,000-ton cruiser Chicago should replace the battleship Texas as fleet flagship; but this innovation has not materialised, and the traditional practice of the Commander-in-Chief flying his flag in a ship of the line has been adhered to. The new fleet flagship is the recently modernised Pennsylvania.

The Battle Force consists of four divisions of battleships, cruisers (yet to be assigned), two flotillas of destroyers, a squadron of minecraft, the carriers Saratoga and Lexington with their complement of aircraft, together with those belonging to the Fleet Air Base, Pearl Harbour, as the old Naval Air Station is now called. The Battle Force is commanded by a Vice-Admiral who is also designated "second in command, U.S. Fleet." His flag is flown in the California.

The principle aimed at by Admiral Pratt, who, as Chief of Naval operations drew up the re-organisation scheme, is that there shall be a minimum of twelve battleships always in commission; of these, nine will be ships with thirty degrees of elevation for their turret guns, giving them an extreme range of 35,000 yards, and three will be ships whose guns have only fifteen degrees elevation. The battleships Idaho, Mexico and Mississippi are being modernised at an ultimate cost of $30,000,000; but the work will presumably be slowed down as the original appropriation for this item in the Bill for 1932 has been reduced by $7,400,000.

The Scouting Force is under the command of a Vice-Admiral with the title "Commander. Scouting Force, U.S. Fleet, and third in command, U.S. Fleet," who flies his flag in the 10,000-ton cruiser Augusta. The Force consists of six divisions of cruisers, a destroyer flotilla, the aircraft-carrier Langley, and the aircraft belonging to the Fleet Air Base, Coco Solo. The Training Squadron, which is

composed of the old battleships Arkansas and Wyoming, and eight destroyers, is also part of this command.

The Submarine Force is under a Rear-Admiral with his flag in the tender Bushnell. It consists of a division of nine "R" boats and the submarine base, New London, Conn.; nine "S" boats and the submarine base, Coco Solo; nineteen "S" boats and the submarine base, Pearl Harbour; and six "V" boats with the Battle Force.

The Base Force (Auxiliaries) is commanded by a Rear-Admiral with his flag in the depot ship Argonne. It is composed of two "Train Squadrons," one serving the forces operating in the Atlantic, the other those in the Pacific.

The Asiatic Fleet is retained as a separate organisation under a Commander-in-Chief with the rank of Admiral. His flag is flown in the 10,000-ton cruiser Houston.

Other units which do not form part of the United States Fleet proper, are the special service squadron based on the Canal Zone and commanded by a Rear-Admiral with his flag in the old cruiser Rochester; the naval transportation service which operates under the orders of the Chief of Naval Operations; special duty ships; and the local craft attached to the district commands.

It is claimed that this re-organisation will save 4,800 men, 120,000 tons in ships, and 11,000,000 dollars in cost.

New Construction.

The following is the position as regards 10,000-ton cruisers:—Completed: the Augusta, Chester, Houston, Northampton, Pensacola, Salt Lake City, Chicago and Louisville. Building: Indianapolis, Minneapolis, Astoria, New Orleans, Portland, Tuscalosa and San Francisco. The last two cruisers on the list were ordered in October, 1930, and February, 1931, from the Mare Island Navy Yard and New York Shipbuilding Company respectively.

Under the London Naval Treaty the United States cannot lay down any more 10,000-ton 8-in. gun cruisers before 1933.

The earlier ships of this class have developed serious constructional defects; these are said to be due to the great length of the hull and the consequent vibration which has caused damage to the stern posts and stern plating. Additional stiffening is to be introduced, but this may affect the speed.

A new carrier, named the Ranger, has been laid down and is due for completion in May, 1934. This vessel is very much smaller than the Lexington and Saratoga, and will displace only 13,800 tons. This represents one-fifth of the unused carrier tonnage allowed to the U.S. Navy under the London Treaty. The Ranger will have a speed of only 29½ knots, as compared with the 33 to 34 knots of the large carriers. The resulting economy in space required for engines and boilers will enable her to carry the relatively large number of seventy-six aeroplanes and a complement of 1,434 officers and men. She will cost $19,000,000.

Under the re-organisation scheme sixteen destroyers are paid off

and placed in reserve. The total destroyer tonnage being retained in commission is 93,000 tons. Future destroyers are to be vessels of 1,500 tons, and flotilla leaders 1,800 tons. Destroyer divisions will consist of four instead of six boats. One destroyer, the first of the new type, has been laid down.

At the beginning of the 1932 fiscal year, fifty-six submarines were in commission. Of forty-three submarines out of commission at the beginning of the fiscal year, forty-two are being or have been scrapped, and one is being used for experimental purposes. Eleven other submarines are laid up for reasons of economy, and under the Treaty will have to be scrapped before the end of 1936. Fleet submarines of the "V" class have all been given names. Six of these craft are now in commission and operating with the Battle Fleet. Three more are under construction.

Naval Air Service.

The importance which is attached to the Naval Air Service is shown by the fact that in addition to the Chief of the U.S. Bureau of Aeronautics, there is a Rear-Admiral in command of aircraft of the U.S. Fleet and of the carrier division with the Battle Force; a Rear-Admiral at the Fleet Air Base, Pearl Harbour; and a Captain in command of the Carrier division attached to the Scouting Force, and of the Fleet Air Base at Coco Solo.

The five-year aviation programme, which was to provide the Naval Air Service with a thousand aeroplanes, a thousand officers and eleven hundred enlisted men, was technically completed on June 30, 1931. Originally the programme made provision for 1,614 aeroplanes, but the total cost of $64,771,600 was reduced by over $22,000,000. A new type of very small flying boat suitable for carrying in a submarine has been adopted. It is a single-seater monoplane with a 100-h.p. engine, and it can be rapidly dismantled and packed into an 8-foot tube.

The loss of the British rigid airship "R 101" has not deterred the Navy Department from proceeding with its policy of developing airships for the use of the fleet. The large new rigid Akron (RZS—4) has reached trials stage: The Los Angeles has been surveyed, and is reported to be good for two to four years more service. In the course of fleet exercises this airship has been successfully moored to the special mast in the naval auxiliary ship Patoka on several occasions. A new airship base is to be constructed at Sunnyvale, near San Francisco, and it is the intention that eventually one large rigid shall be based on the Pacific and the other on the Atlantic coasts.

JAPAN.

Naval Estimates.

Naval Estimates for 1931–32 provided for an ordinary expenditure of £14,229,300 and an extraordinary expenditure of £6,804,100, making a total of £21,033,400, which is a decrease of

about £5,000,000 on the previous year. The estimates included £954,000 for initial yearly replacements resulting from the London Naval Treaty. Later in the year the Government, faced with the prospect of a considerable deficit in the budget, proposed to make a cut of about £1,300,000 in naval expenditure, but this has been meeting with considerable opposition, and it is understood that the reduction will be only about half this sum. The projected programme for new construction, to be spread over the next six years, is four cruisers, twelve destroyers, nine submarines, one minelayer and thirteen auxiliary ships. Under the terms of the Naval Treaty the battle cruiser Hiyei is being demilitarised and adapted as a training ship.

New Construction.

The Chokai, launched at Nagasaki on April 5 from the works of the Mitsu Bishi Company, is the last of the twelve 8-inch gun cruisers allowed to Japan under the London Naval Treaty. The first group of four 8-inch cruisers were vessels of 7,100 tons, the second group of four displaced 10,000 tons; all these are in commission. The last group of four also displace 10,000 tons, and were due for completion late in 1931 or early in the following year. It is reported that the under-water protection of the latest ships has been considerably increased, while steps are being taken to improve the living quarters of the ship's company, which are reported to have been very hot and uncomfortable in the earlier 8-inch cruisers.

The next class of cruisers to be built will probably be ships of about 8,500 tons displacement armed with 6-inch guns.

The old second-class cruisers Chikuma and Tone have been removed from the effective list.

The new small aircraft carrier Ryujo was launched in April, 1931. She is a ship of 7,000 tons, and is designed with a maximum speed of 25 knots and to carry an armament of twelve 5·1-inch guns. She will have a complement of 600.

Ten new destroyers of 1,700 tons, carrying an armament of six 4·7 guns and nine torpedo tubes, are in course of construction. Ten old second-class destroyers of the Kaba type are being scrapped. Orders have been placed for the construction of two torpedo boats of 600 tons.

Naval Air Service.

In order to compensate in some measure for the restrictions placed on the surface navy by the London Naval Treaty, the Ministry of Marine propose to increase considerably the Naval Air Service. According to a report in the Japanese Press, it is the intention that there shall ultimately be fourteen shore-based squadrons, totalling 180 aircraft. These will include seven squadrons, each composed of sixteen torpedo bombers; three squadrons each of sixteen fighters; one squadron of two large flying boats; and three squadrons each of six medium flying boats.

A very large flying boat built in England for the Japanese Navy

by Messrs. Short Bros., was taken over in Japan during April. This craft has a loaded weight of about 18 tons, a non-stop range of 2,000 miles, and a disposable load of 4,000 lbs. in addition to fuel. It is understood that a licence has been secured by the Kawanisi Aircraft Company in Kobe to build flying boats of this type.

The Naval Air Station at Tateyama in Tokyo Bay is now completed and in use. A new station is to be built by the Ministry of Marine near Ominato. It will be specially devoted to anti-aircraft defence.

The Japanese navy continues to experiment with small dirigibles, and an airship of the "S.S. 9" type designed and built in the country is reported to have carried out very satisfactory trials.

FRANCE.

THE NAVAL VOTE.

A Bill for the 1931–32 construction programme was debated in the Chamber on June 18. The opposition to the proposal to lay down a 23,000-ton battle-cruiser was so great that the Government accepted a reduction to £4,000,000 from the original £8,799,000, and gave an undertaking that this vessel should not be begun until the Chamber had had another opportunity to consider the design. From a political point of view it was urged that the ship might prejudice the outcome of the 1932 Disarmament Conference. It was suggested that France should propose a reduction in the existing maximum displacement for capital ships, failing agreement to which new ships should be built up to the 35,000-ton limit. It was also disputed that a ship of 23,000 tons is required to counter the new German battle-cruiser of 10,000 tons, but the Minister of Marine stated that his technical advisers consider that to be the minimum tonnage on which it is possible to provide the requisite offensive and defensive requirements. He also protested strongly against the suggestion that Germany might build eight 10,000-ton ships, and maintained that the Versailles Treaty only permitted her to build six. The existing design for a 23,000-ton ship includes an armament of eight 12-inch and twelve 3·9-inch A.A. guns. The armour would include two protective decks.

On December 18, 1931, the Chamber adopted the naval programme for 1932–33. It includes four cruisers of 7,500 tons, armed with eight 6-in. guns, and capable of a speed of 32 knots; one destroyer: one torpedo boat; one hydrographic vessel; and a river gunboat. A sum of about £10,000,000 (at par) for the construction of these ships is to be spread over the years up to 1937.

The modernisation of the Courbet and Lorraine having been completed, they have relieved the Paris and Provence which are now in hand. The Jean-Bart is due to relieve the Bretagne, when the latter will also be modernised. In the case of the Lorraine, only one-third of the boilers have been converted to burn oil.

New Construction.

The 10,000-ton cruiser Algérie was laid down in March, and no further vessels of this class are projected for the present. Details of this ship were given in last year's " Annual," but according to later information she will have twelve instead of eight 3·9-inch A.A. guns and a new design of mast.

It is reported that the new 7,500-ton cruisers will be of an improved Emilé-Bertin class (cruiser-minelayer, 5,890 tons). They are to have the same armament of nine 6-inch guns in triple turrets and the same high speed—36 knots—but they are to be much more heavily protected. The first two (CL2 and CL3) have been assigned the names La Galissonnière and Jean-de-Vienne.

The six flotilla leaders laid down in 1928 and 1929 have all been launched, and the majority have completed their trials. Construction is proceeding regularly on the next six ships of this type, laid down in 1930. Six further leaders D.16–21 are appropriated for. These latter will be vessels of 2,600 tons. The first two are due for completion in May and July, 1933. The following are the names which have been assigned to them: Le Fantasque, L'Audacieux, Le Malin, Le Triomphant, Le Terrible, L'Indomtable.

The large submarine Surcouf carried out trials with her 8-inch guns in June, and it is reported that " on the whole " they were successful. She was due to commission before the end of 1931. France has an exceptionally large programme of submarines in various stages of construction. During the past five years she has laid down twenty-four first-class, sixteen second-class, and three minelaying submarines ; while a further six of the first, four of the second class and one minelayer were due to be laid down under last year's programme.

The submarine depot-ship Jules Verne was launched early in 1931. She is being equipped with an optical laboratory for refitting large periscopes. Her complement will be nine officers and a ship's company of 224. She will also have accommodation for 15 submarine officers and 250 submarine petty officers and men.

Four sloops, specially designed for service in the tropics, are being built. They are vessels of 1,968 tons and will have an armament of three 5·1-inch and four small A.A. guns, and a speed of 15·5 knots. The hull is interlined with a double layer of insulating soil and a cushion of air to keep out the heat. Their draught will be shallow to enable them to work in inland waters. The complement will be 14 officers and 121 men. Two more sloops of this class have been authorised.

A minesweeper and net-layer of 3,000 tons displacement is being built at Lorient. She is to be called the Gladiateur. Provision has also been made for two submarine chasers and a coastal motor boat. A naval oiler, the Van, of 9,000 tons has been built at Hamburg for France as part of Germany's reparations.

Personnel.

Admiral Durant-Viel has succeeded Admiral Violette as Chief of the General Staff at the Ministry of Marine, and has been succeeded in command of the Mediterranean fleet by Vice-Admiral Robert. Admiral Robert was appointed as an additional member of the Conseil Superieur de la Marine for 1931.

Better facilities are being given to officers of the Naval Reserve for periods of training in the formations or units to which they will be allocated on mobilisation, and they are encouraged to volunteer to take part in exercises on shore or at sea.

Air Organisation.

In the course of the debate on the Air Estimates for 1931, M. Leygues, formerly Minister of Marine, asserted that naval aviation was in a deplorable state—the result of separating the Navy and its air arm. The aircraft supplied for naval work are, he maintained, insufficient in number and inadequately tried out before orders are placed for a whole series of one type. He complained also that the position of naval officers attached to serve under the Air Ministry was intolerable. They had to choose between transferring permanently and giving up a profession after long years of training, or reverting permanently to the navy proper with the risk of losing seniority. The Air Minister agreed that a " Statute for Air Personnel " ought to be established without delay, and added, " I do not forget that I was once Minister of Marine."

ITALY.

Naval Estimates.

The Estimates for 1931–32 amount to about £17,000,000, which represents an increase of about £1,000,000 on those for 1930–31. Of this sum approximately half is for new construction—a remarkably high percentage.

The Minister of Marine, Admiral Sirianni, when introducing the naval estimates in May, 1931, analysed the arguments for and against battleships and aircraft carriers. He asserted that Italy must build both types; but that future programmes must be governed by the existence or non-existence of agreements. In consequence Italy's programme, which could not in any event be begun until the end of 1931, was not definitely settled. In the course of the debate Senior Rota made detailed comparisons of the latest types of Italian and French warships. Judging from his remarks, the proposal of her neighbour to build a 23,000-ton battleship is to Italy a source of as much interest and anxiety as the new German 10,000-ton ship is to France. He noted, too, that as an answer to the Italian 5,000-ton cruisers of the Condottieri class, France was about to build ships of 7,500 tons, while she was already building destroyers of over 2,000 tons. Senior del Carretto stated

that all the units of the 1930 programme would enter service during 1931–32, while those included in the supplementary part would be in full development. This latter includes the Pola, a 10,000-ton cruiser of the Zara type; the Muzio Attendolo and Raimondo Montecuccoli, 5,500-ton cruisers of the Condottieri type; four Baleno class destroyers of 1,400 tons; four ocean-going submarines, six of medium and twelve of coastal types. This programme, he asserted, was being "methodically developed with the purpose of protecting our dignity and interests."

New Construction.

The position as regards the 10,000-ton cruisers is that the Trento and Trieste are completed; the Zara and Fiume of the 1928–29 programme, should have been finished by the end of 1931; work on a third ship of the Zara class—the Gorizia—launched at Leghorn in December, 1930, is being hastened by special request of Mussolini; a fourth ship, the Pola, was laid down in March. These four ships are of a newer design, in which 3–4 knots is being sacrificed for the sake of greater protection. In spite of this, the Zara when carrying out steam trials is reported to have attained an average speed for eight hours of 34·2 knots. Yet another 10,000-ton cruiser, the Bolzano, belonging to the 1929–30 programme, has been launched. This ship is a modification of the more lightly protected but faster ships of the Trento class.

Of the Condottieri 5,000-ton class, four are in commission, two more are due for completion in 1932, and a further two have been appropriated for. These ships are regarded as being the "answer" to the large French flotilla leaders. As a class they are proving to be exceptionally speedy, and on trials the Alberto da Giussano, one of the group of three built in the Ansaldo Yard, is reported to have attained a speed of 40·7 knots, and to have averaged 39·8 knots on a 160-mile course with her full armament on board. Carrying eight 6-inch and six A.A. guns, and four torpedo tubes, they are remarkably well armed little ships for their size.

The twelve leaders of the Verazzano type, known as the Navigatori class, are all completed. These vessels are also proving very fast; the Alvise-Cadamosto is reported to have attained a maximum speed of 43 knots and a mean speed of 41 knots on her trials.

The eight 1,200-ton destroyers of the Dardo class have all been launched. Four more of this class, as already mentioned, are being built as part of the supplementary programme. Italy continues to build up her submarine forces, and, as already noted, has provided for a number of additional under-water craft in her latest programme. Chief importance is attached to acquiring a number of the small defensive type of about 600 tons.

Personnel.

In reviewing the question of the best age for entering naval officers, the Minister of Marine has expressed the view that it is

better that they should start their professional training after they have graduated at the secondary schools. He noted that in England there were two systems, and admitted that in a country where tradition means so much the Dartmouth entry was comprehensible; but, for Italy, he favoured a system which was more on the lines of the British "Special Entry," whereby the character of entrants is more formed, and they have a wider outlook on life before adopting a specialised career. In short, he wished that they "would be a little more men before they became warriors."

Sea-going training is carried out in two full-rigged sailing ships and three destroyers, two submarines and the other small craft make up the Training Squadron. The Rear-Admiral of the Naval Academy hoists his flag in one of the ships during the summer cruise.

GERMANY.

Estimates.

The Naval Estimates for 1931 were passed by the Reichstag in March. They amount to 192,000,000 marks (£9,600,000), as compared with 188,600,000 marks in 1930. Of this 43,000,000 marks (£2,150,000) is assigned to naval construction.

New Construction.

An event of great importance to Germany's budding navy was the launch at Kiel on May 19 of the Deutschland (Ersatz-Preussen). Although limited by the Versailles Treaty to a standard displacement of 10,000 tons, the German designers have produced a ship which may seriously disturb foreign construction programmes. In effect a small battle-cruiser, she is essentially a capital ship, and marks the beginning of what might well be the fastest and most up-to-date, even if not the most powerful, battle squadron in the world.

In spite of much political opposition, financial provision has been made for laying down a second ship of this class—the Ersatz-Lothringen, while a third is projected for 1932, and a fourth for 1936. It is anticipated that each vessel will take about four years to build.

The old battleships Lothringen, Braunschweig and Elsass were struck off the effective list as from March 31, and are being sold.

The cruiser Leipzig was due for completion by the end of 1931. The old cruisers Amazone, Nymphe and Hamburg have been struck off the effective list. The Hamburg is to be converted into a naval museum.

The gunnery training ship Bremse (Ersatz-Drache) was due for completion by the end of 1931. She is a ship of 1,250 tons, and has engines of 25,000 h.p., to give a speed of 27 knots. Her armament will be varied as circumstances necessitate. A second ship, the Ersatz-Hay, is to be laid down in 1936.

The programme of new construction for the next six years, projected by the Ministry of Defence, includes, in addition to the

battle-cruisers, four destroyers, five torpedo boats, five coastal vessels, six mine-searching boats, and several small craft. The average estimated expenditure for this programme is 50,000,000 marks.

SPAIN.

The revolution in April, 1931, followed by the establishment of a Republic, has necessarily caused somewhat of a set-back in Spanish naval development; but, on the whole, the navy seems to have conformed to the new regime peacefully and loyally. Certain units have been re-named, thus the battleship Alfonso XIII becomes the Espana, and the cruisers Principe Alfonso and Reina Victoria Eugenia become respectively the Libertad and Republica.

The fleet has been re-organised, and the only two battleships have been placed in the second reserve. The Commander-in-Chief of the squadron has transferred his flag to the cruiser Miguel de Cervantes, and the Rear-Admiral Chief of the Cruiser Squadron to the Almirante Cerveva. The new organisation is as follows:—First Division—Miguel de Cervantes, Libertad and Republica; Second Division—Almirante Cervera, Mendez Nunez and Blas de Lezo. The last-named cruiser is being repaired at Cadiz, and the Extremadura has been placed in reserve.

New Construction.

Financial reasons have compelled the slowing down of the construction of the 10,000-ton cruisers Canarias and Baleares, and completion is probably postponed till 1935 and 1936. The Canarias was launched at Ferrol on May 28, 1931. The construction of new torpedo craft and submarines is also likely to be postponed or delayed.

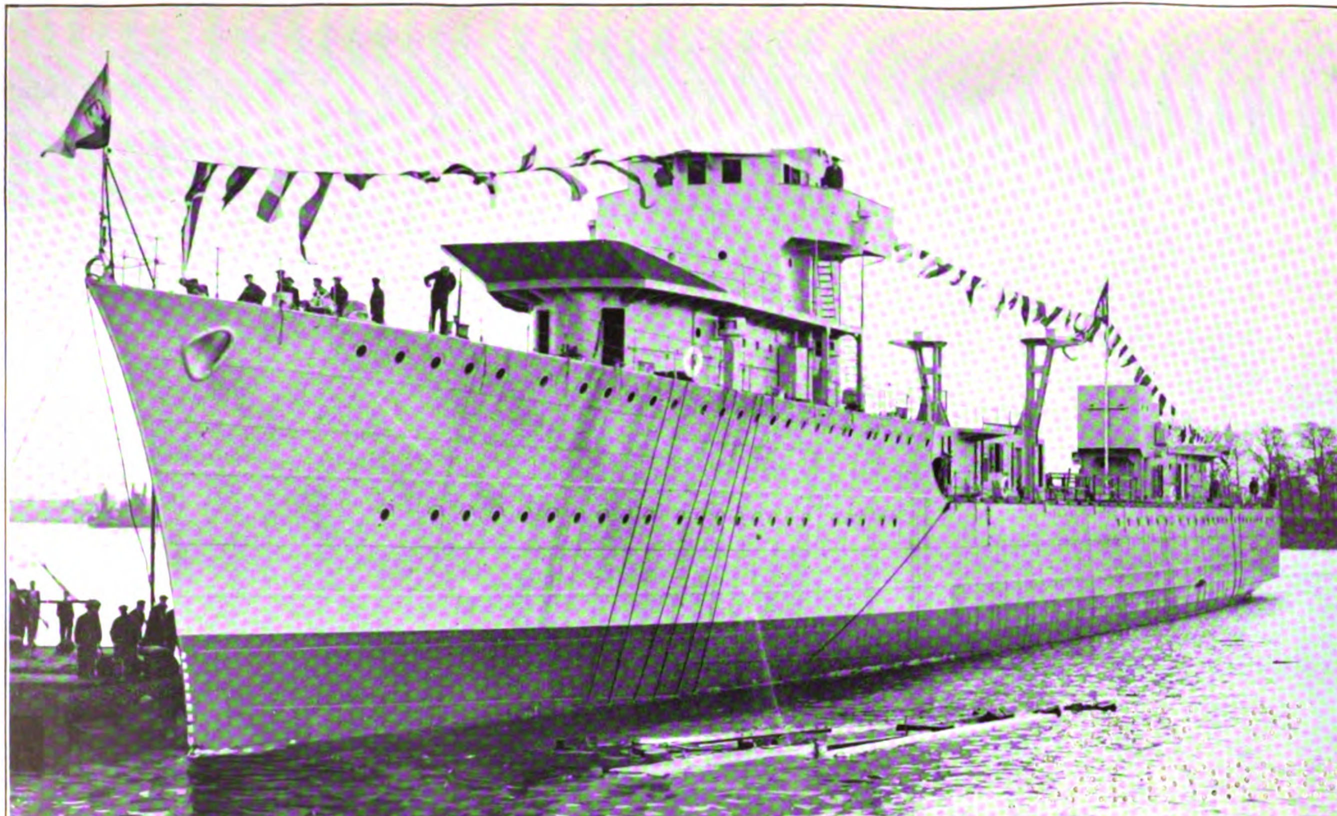
Changes in Administration and Personnel.

Under a Decree published on July 19, 1931, Command and Administration are separated, and the Ministry of Marine is re-organised with an Under Secretary (of a civil character), a General Naval Staff, a Supreme Naval Council, Technical and Administrative Services, and a Council of Administrative Services. Administration is to be subordinate to the Command. The Naval Air Service will be controlled by a Naval Air Directorate, except that for operational purposes it will be under the General Naval Staff.

The ranks of Captain-General and Admiral of the Fleet have been abolished. Close liaison is to be maintained between the officers of the Executive and Engineering branches, and at the Naval School, which is also being re-organised, the two branches will study together subjects common to both. Facilities for retirement on full pay are offered to surplus officers and men.

The principal Naval Bases to be maintained are those at Ferrol, Cadiz and Cartagena; auxiliary bases will also be kept going at Rios and Mahon.

The reduction in expenditure following on the re-organisation of the Navy is estimated to be 25 million pesetas (about £500,000).



THE YUGOSLAV FLOTILLA LEADER DUBROVNIK, 2,400 TONS.

Launched at Scotstoun, October 12, 1931.

(By courtesy of the builders, Yarrow and Co., Ltd.)

OTHER FOREIGN NAVIES.

Denmark.

Three small torpedo boats, the Glenten, Hogen and Ornen, of 285 tons, have been ordered. A new Royal Yacht is also under construction. The present yacht, the Dannebrog, is a paddle-steamer built in 1879.

A new naval aerodrome, covering about 100 acres, has been established at Vordingborg.

Finland.

The second of the armoured coast defence ships, the Ilmarinen, was launched at Abo on July 9, 1931. The submarine Iku-Turso was launched from the same port in May, 1931. A training frigate, the Oldenburg, has been completed.

Greece.

Under the new policy for modernising the fleet, the old battleships Lemnos and Kilkis (*ex*-U.S. Idaho and Mississippi) are to be scrapped, and it is probable that the armoured cruiser Georgios Averoff will meet with the same fate before very long. The new programme of construction, covering the period up to 1937, includes two destroyer flotillas, each with a leader and eight destroyers, and two submarines. Of the former four destroyers are completing, and four more will be laid down shortly. It is also proposed to spend considerable sums in bringing the arsenals, coast defences, submarine bases and naval schools up to date.

The naval air service is being increased by twelve Fairey III F. float planes, similar to those in use in our own Fleet Air Arm.

Netherlands.

In spite of considerable political opposition, a Bill has passed the Second Chamber authorising the construction of one cruiser and a flotilla vessel for the naval forces in the Dutch East Indies, and a gunboat for the West Indies. Some details of this vessel were given in last year's "Annual."

The Van Nes, the last of the eight destroyers designed by Messrs. Yarrow & Co., and constructed in Holland under their supervision, was commissioned in the spring of 1931. All these vessels belong to the East India squadron. The cruiser Sumatra ran aground on May 14, 1931; but after being lightened was refloated and taken to Surabaya Dockyard for repairs.

Norway.

Financial restrictions have precluded any development calling for comment during the past year.

Training exercises with small craft were carried out during the

summer, but the Norwegian Navy is suffering badly from old age. The small coast defence battleships are all over thirty years old, and the torpedo craft are fifteen to twenty years old. The only modern units are six small submarines, built between 1923 and 1929. Political obstruction appears to be delaying provision for replacements and carrying into effect the policy of modernising the fleet.

Portugal.

Extensive orders for new construction have been placed by the Portuguese Government; the most important of these have gone to British firms. Four 1,400-ton destroyers are being built by Messrs. Yarrow, and two 1,000-ton sloops by Messrs. Vickers. In addition two 2,000-ton sloops, two small submarines and an aircraft transport have been ordered in Italy. Of the four destroyers, two will be built on the Clyde and two, under Messrs. Yarrow's supervision, at Lisbon. They will be vessels of a thoroughly up-to-date design, and will be fitted with the latest pattern of Yarrow water-tube boilers, superheaters and air heaters; the steam pressure will be 400 lbs. to the square inch. The guaranteed speed is 36 knots. Special attention is being paid to the ventilation of living and working spaces in order to fit the vessels for service in tropical waters. The armament and munitions for all the foregoing ships is being supplied by Messrs. Vickers, and the total value of the orders placed in Britain amounts to about £2,000,000.

Six Moth aeroplanes supplied by the de Havilland Company, and six flying boats of the Macchi type from Italy, are now part of the equipment of the naval air station at Boni Sucesso.

Rumania.

In June, 1931, the destroyers Marasti and Marasesti, under the command of Vice-Admiral Prince Nicholas, paid a five days' visit to Malta. The visit was in return for that made by a British squadron under Rear-Admiral A. J. Davies in August, 1930.

Soviet Union.

The Soviet Press, which, of course, is under close Government control, continues to adopt the attitude that Russia is in danger of attack by " capitalist " Powers, and it sees a sinister purpose behind every visit of foreign warships to the Baltic.

According to one Russian report, their fleet has been increased by " nine large and many small units " during the past two and a half years. At the same time it is stated that " ten warships of an obsolete type have been paid off." There is, however, no evidence of any important construction for the Soviet navy of late years. In fact the " Armaments Year Book," published by the League of Nations, shows that the number of " large units " is limited to four battleships, four cruisers, one aircraft carrier (an old battleship), and one training ship (an old cruiser). The only building in progress appears to be three submarines and possibly some auxiliary craft.

In the early part of 1931 a Turco-Soviet Naval Pact was signed, by which it was agreed that neither country would lay down any fighting naval unit intended to strengthen its own fleet in the Black Sea or contiguous waters, nor place an order for such a unit in a foreign yard, nor take any other measures for increasing its naval forces in those waters without giving six months' notice to the other contracting party.

During exercises in the Baltic last summer, the submarine No. 9 (*ex*-Rabotchy, *ex*-Yersh) was lost with all hands. The English submarine L.55 which was sunk off Kronstadt in 1919, and raised by Soviet Russia in 1928, is stated to have been reconditioned.

Sweden.

Naval Estimates for 1930–31 amounted to 45,069,680 kn.—about £2,490,000—and approximately the same as for the previous year. According to the League of Nations' "Armaments Year Book," when the new defence organisation has been fully established, naval expenditure will be reduced to 32,525,000 kn.

The only additions to the fleet pending in the near future are the small hangar cruiser Gotland, which, despite a certain amount of criticism, has now been laid down; and two destroyers, the Klas Horn and the Klas Uggla, which were launched on June 13 and 18, 1931, respectively.

There is still a good deal of friction between the Navy and the newly constituted Air Force. The C.-in-C. of the Coastal Fleet has made urgent representations that airmen under training for co-operation with the Navy were receiving all their training on land machines; not unnaturally he has refused to be responsible for the consequences.

Turkey.

The Turco-Soviet Pact, already referred to,* does not affect the construction of ships already laid down in Italy for the Turkish Navy. These include four destroyers, two submarines and three submarine chasers. Two of the destroyers, the Kocatepe and Adatepe, were launched in the early part of 1931, and are due for completion shortly. A third, the Tinaztepe, was launched in July, and the fourth has been laid down.

A Turkish Naval Attaché has been appointed to Rome. Previously these duties had been performed by the Military Attaché.

Yugoslavia.

The flotilla leader Dubrovnik was launched by Princess Olga of Yugoslavia from Messrs. Yarrow's Yard at Scotstoun, Glasgow, on October 12, 1931. This vessel will displace 2,400 tons, and have engines of 42,000 h.p., which are designed to give a speed of 37 knots. The armament will be four 5·5-inch guns and two triple torpedo tubes.

* See Soviet Union.

SOUTH AMERICA.

ARGENTINE.

The new cruisers Venticinco de Mayo and Almirante Brown, which were built in Italy, at Leghorn and Genoa respectively, have been taken over. There is good reason to believe that these ships are by no means an unqualified success; both had to put back to Las Palmas on their voyage out owing to engine trouble in the Venticinco de Mayo. They finally sailed from that port on September 2.

The masted training ship Presidente Sarmiento has completed her thirty-first training cruise. She is reported to have covered nearly a million miles since she was built in 1898.

BRAZIL.

The Brazilian Navy suffers from the uncertain politics of the country, which inevitably effect efficiency and preclude any appreciable progress. The only events of importance during 1931 were the launch of a small river monitor of about 450 tons and the acquisition of eleven Savoia flying boats. The latter were built in Italy and subsequently flown out to Rio de Janeiro. They were purchased by the Ministry of Marine at a value of about £9,200 each. Actually they were paid for by a shipment of 50,000 bags of coffee.

CHILE.

The Estimates for 1931 amount to 89,675,282 pesos, a reduction of about 30,000,000 pesos on the previous year.

The battleship Almirante Latorre (*ex*-Canada), having completed an eighteen months' refit and modernisation in Devonport Dockyard, carried out acceptance trials in February and returned to Chile in March under the command of Captain A. Campos.

On September 1 there was a general revolt of the crews of the fleet on account of a reduction in their pay which had been ordered by the Government. The following day the Cabinet resigned and the new Cabinet which was promptly formed proclaimed martial law. Efforts were made to induce the mutineers to come to reason, but these having failed, on September 5, 1931, the Army and Air Force, which had remained loyal to the Government, took action. The Army occupied the Forts and Signal School at Valparaiso and the naval bases at Quinteros and Talcahuano. Considerable resistance was shown in the case of the latter, and casualties occurred on both sides. On September 6 the fleet at Coquimbo was bombed by some eighty aeroplanes. None of the ships was hit, but the effect was sufficient to produce a general surrender of the crews, and the ringleaders were arrested. Subsequently the Admiralty dismissed two Vice-Admirals and numerous Captains and Commanders. These officers, it is explained, were not considered to have been involved in the seditious movement, but to have failed in their duty in the face of the occurrence.

Colombia.

The river gunboats Cartagena, Santa Marta, and Barranquilla have been completed by Messrs. Yarrow, and crossed the Atlantic under their own power. These vessels were mentioned in the last "Annual." They are of twin-screw design with raised propellers working in tunnels, in order to suit the arduous navigating conditions. The designed speed, 15½ m.p.h., was exceeded on trial.

ASIATIC.

China.

An order for a small cruiser of about 2,000 tons to carry six 5·5-inch guns, and with a speed of 24–25 knots, has been placed in Japan. It is reported that a second ship of this class and a small seaplane carrier are to be built at Shanghai.

The new gunboat Min Sung was launched from the Kiangnan Dock, Shanghai, in May last. The gunboat Yat Sen has completed her trials. Five more of these craft are reported to have been laid down.

So far there is no evidence that the Nationalist Government intends to place substantial orders for new warships in Britain. In view, however, of the special services which are being rendered to the Chinese Navy by the British Naval Mission, and of the facilities given to Chinese naval officers for training in British establishments, it is to be hoped that our shipyards will derive some benefit in due course.

Persia.

The Persian Navy, which at present consists of two antiquated gunboats, will be augmented during 1932 by two new sloops and four motor launches, all building in Italy. The gunboats, which are being constructed in the Navali Riunita Yard at Palermo, resemble the British Alresford class. They are vessels of 950 metric tons displacement, and will be armed with two 4-inch, two 3-inch A.A., and two machine guns. They will have two F.I.A.T. Diesel engines of 450 h.p., each designed to give a maximum speed of 15 knots. Their oil-fuel capacity of 120 tons will give them an endurance of 4,000 miles. The four launches will be craft of 330 tons displacement, armed with two 1-inch and two machine guns. They will have a speed of 15½ knots and an endurance of 1,200 miles.

In view of the increasing penetration of Italian interests in the Gulf, it is interesting to note that the senior officers of this miniature navy are to be Italian. The junior officers will be provided from the Persian cadets now training in Italy.

E. Altham,
Captain, C.B., R.N.

CHAPTER III.

Comparative Strength and Distribution.

During 1931 the capital ships of the British and United States Navies were scaled down to a total of fifteen each in accordance with the London Naval Treaty. The total for Japan under the Treaty will be nine ships, but for the present the Hiyei, which is to be retained for training purposes only, still figures in the list, making a total of ten. Under Article 2 of the Treaty, the work of reducing vessels which it is permitted to retain for training purposes to their required condition was to begin, in the case of the United States and Great Britain, within twelve months of the coming into force of the Treaty (i.e. by December 31, 1931), but in the case of Japan the period was extended to eighteen months, or by June 30, 1932. In each case the work is to be completed within six months.

The German armoured ship Deutschland (late Ersatz-Preussen) was launched in 1931, but no new ship of this class was laid down for any navy, although others are projected in Germany and France. Objections on technical as well as financial grounds have served to delay the appearance of more vessels of this category.

Italian Cruiser Activity.

Italian activity in cruiser construction during the past five years has now placed her definitely in the position of second strongest Power in Europe in this class of vessel, in which she has displaced France. By the completion of the first four ships of the "Condottieri" type, Italy increased her total of effective cruisers from twelve to sixteen. The French total of fifteen remained unchanged. Nor do these figures stand alone. Supplementing them, France has in hand three cruisers, whereas Italy has nine. Three of the latter, the Bolzano, Zara, and Fiume, are already at the trial stage. Since 1927 France has laid down cruisers at the rate of one ship each year. Italy has laid them down at the rate of three ships each year. Her total of completed flotilla leaders and destroyers also shows a larger increase than that of France. Hence it can definitely be said that Italy, even though she has fewer battleships and fewer submarines, is implementing her claim to parity with France in those classes which she regards as essential to her fleet. It should be pointed out that in both countries the cruiser material of their navies had been allowed to fall into a bad condition. France laid down no cruisers during the years 1906–22, and Italy none during the years 1911–25. The outstanding feature of the progress made since then has been the vigour, determination, and expedition with which Italy has undertaken the construction necessary to restore her position.

British Cruiser Strength.

At the beginning of 1931 there were fifty-four cruisers on the effective list of the Royal Navy. One was added during the year, the Exeter; three were scrapped, the Calliope, Carysfort, and Cleopatra (built in 1914–15), reducing the total to fifty-two. This is made up as follows :—

"C" class, completed 1915–1922, 3,895–4,290 tons, four or five 6-inch guns .	21
Brisbane and Adelaide (Australian Navy), 1916–1922, 5,120 tons, eight or nine 6-inch guns	2
"D" class, completed 1918–1922, 4,850 tons, six 6-inch guns	8
"E" class, completed 1926, 7,550–7,580 tons, seven 6-inch guns	2
"Hawkins" class, completed 1918–1925, 9,700–9,996 tons, six or seven 7·5-inch guns	4
"County" class, completed 1928–1930, 10,000 tons, eight 8-inch guns . . .	13*
"B" class, completed 1930–1931, 8,400 tons, six 8-inch guns	2
Total . .	52

* Includes 2 Australian Navy.

Included in the twenty-one cruisers of the "C" class are three which were completed in 1915, and attained the age limit of sixteen years in 1931, the Comus, Champion, and Castor. They have not been scrapped, nor can be without reducing the British cruiser total below the minimum of fifty ships which the late Labour Government agreed to accept at the time of the London Naval Conference, contingent upon reductions in the cruiser strength of other countries. Only the United States and Japan signed Part III of the London Treaty which was to give effect to this bargain. France and Italy, who did not sign, still remain outside its scope, and the activity in warship building by these two Powers is the outstanding feature of a review of comparative naval strength at the present time. During the early part of 1931 the British Government exerted strong influence to get France and Italy to adhere to the principles of limitation embodied in Part III of the Treaty. In reply to a question in the House of Commons on February 4, 1931, the First Lord, Mr. Alexander, said that "if they (the Government) were unable to do that they would have to reconsider the position." So the matter stands at the moment.

Obsolete British Cruisers.

During 1932 the Royal Navy will begin to feel seriously the dual disadvantage of having, on the one hand, large groups of cruisers approaching their age limit at the same time; and, on the other, of the failure to anticipate this situation by the early laying down and expeditious building of new ships. In 1925 a Cabinet Committee under the late Lord Birkenhead recommended a schedule of replacement building which would have provided the necessary new tonnage, but because this construction was not absolutely required immediately, and there were other calls for expenditure, it was reduced, postponed, or suspended from time to time, until it has now become urgent, even though the country is in a worse position to

undertake the obligation financially than it was before. Fortunately, the discharge of such a liability can be spread over several years. As previously mentioned, three cruisers have already reached their nominal age limit of sixteen years, but must be retained on the list. During 1932 six more will reach this age limit, but no new cruiser is due to enter service. The position may be shown in the following table :—

CRUISER STRENGTH, AGE LIMIT 16 YEARS.

Year.	Due for Scrapping (Age Limit 16 Years).	Due for Completion.	Total left under 16 Years.
1932	Castor, Concord, Comus, Canterbury, Champion, Centaur, Constance, Brisbane, Cambrian	(nil) (1928 programme cancelled)	43
1933	Caradoc, Calypso, Caledon, Ceres, Curlew, Cardiff	Leander, authorised 1929 Achilles, Neptune, Orion, authorised 1930	41
1934	Curacoa, Coventry, Carlisle, Vindictive, Danae, Dauntless, Dragon	3 ships, authorised 1931	37
1935	Delhi, Dunedin, Cairo, Calcutta, Colombo, Hawkins	? 3 ships, to be authorised 1932	34
1936	Effingham *, Frobisher *	? 4 ships, to be authorised 1933	36

At the present restricted rate of building this country will need to retain on the list up to as many as sixteen cruisers over the age limit in order to make up its agreed total of fifty. While none of these sixteen cruisers will be over twenty years of age, the majority of them will be nearer twenty years than sixteen. The whole problem arises from the fact that such a large proportion of our cruiser fleet was built during the War period. There were twenty-two British cruisers now serving which were completed during the years 1915 to 1918 inclusive. No American, Japanese, French, or Italian cruisers were completed during that period, although France and Italy have in service a very few cruisers built by Germany in the War and ceded to them at the peace. Otherwise their fleets are composed chiefly of newer and stronger vessels, embodying the lessons of the late War.

CRUISERS OF OTHER POWERS.

The United States has now twenty effective cruisers, a gain of one on last year. Three new ships of the 10,000-ton class, the Louisville, Chicago, and Augusta, were passed into service, but two

* Under the special provisions of the London Naval Treaty.

[Photo by Beken and Son, Cowes.

H.M. FLOTILLA LEADER KEMPENFELT, 1,390 TONS.

Launched at East Cowes, October 29, 1931.

(By courtesy of the builders, J. Samuel White and Co., Ltd.)

old cruisers, the Galveston (completed 1905) and Denver (completed 1904), were scrapped. Only two pre-War cruisers, the Pittsburg and Rochester, now remain in the United States cruiser list, and both are listed for disposal.

The Japanese cruiser total declined by two, from twenty-nine to twenty-seven, owing to the Chikuma (completed 1912) and Tone (completed 1910) being struck off the list. Like the United States, Japan has now only two pre-War cruisers in her list, the Yahagi and Hirado (completed 1912).

Germany's cruiser total declined from nine ships to six, as although one new vessel, the Leipzig, was passed into service, four old cruisers were scrapped, the Arkona, Berlin, Amazone, and Nymphe (completed 1900–1905). Although numerically inferior, the German cruiser force is now much more efficient than in earlier years since the armistice, as five out of the six ships are of post-War design.

As with cruisers, so with flotilla leaders and destroyers: France and Italy are the only Powers which report additions to their totals of completed vessels. Great Britain, the United States, and Japan all have fewer vessels in their lists, the new construction they have completed having been more than counter-balanced, so far as numbers go, by the scrapping of old craft.

The aggregate number of submarines in the navies of the six principal Powers—Germany is not allowed any under the Versailles Treaty—is 344, a decline of twenty-one on the total listed in the last "Annual." This is chiefly accounted for by the scrapping of sixteen older submarines by the United States. On the other hand, there is an increase of six in the number of submarines under construction, from ninety to ninety-six, owing to the fact that ten vessels are building for the Soviet Union as compared with three last year. The British total shows a decline of one, from ten to nine, and the American, Japanese, French, and Italian totals remain the same as last year. The French and Italian totals are still very high—thirty-nine and thirty-one respectively.

Aircraft Carriers.

There is again no change to be noted in the aircraft carrier lists of the principal Powers. During 1931 the United States proceeded with the construction of the Ranger, Japan with that of the Ryujo, and France with that of the Commandant Teste (aviation transport). These ships, of from 7,600 to 13,800 tons' displacement, indicate a definite departure in design from the huge carriers under construction a few years ago, the high-water mark of which was represented by the 33,000-ton Lexingtons. In the meantime progress has been made in the design of catapults for launching aircraft into flight from regular men-of-war, and every new cruiser is being so fitted. The trend of events would seem to support the view that the future of the Fleet Air Arm lies rather in the use of seaplanes operating from fighting ships than in the use of land machines flown from and returning to the large carriers.

Personnel of the Powers.

The heavy cuts in British naval personnel to which attention was directed by the late First Lord in his Memorandum of March 2, 1931, amounting to 10,000 officers and men within the space of four years, have not been followed in other countries. The following official figures have been given regarding the effective strength in personnel for the five principal naval Powers on the dates mentioned :—

	Aug. 1, 1914.	Nov. 11, 1918.	Jan. 1, 1931.
Great Britain	152,000	427,000	101,750
United States	67,258	503,792	109,350
Japan	50,645	64,122	79,567 (*a*)
France	69,585	80,000	60,949 (*b*)
Italy	40,023	127,401	46,430 (*c*)

(*a*) Including air service personnel.
(*b*) Excluding 5,256 air service personnel.
(*c*) Including air service personnel.

Whereas Great Britain has reduced her naval personnel by 33 per cent. on the pre-War strength, there is an increase of about 60 per cent. in that of the United States and Japan, while the French total is little below that of 1914.

Fleet Distribution.

The principal change in the distribution of the British Fleet during 1931 was the disappearance of the Third Battle Squadron, which was employed on the sea-going training of boys. The flag of Rear-Admiral George F. Hyde, C.V.O., C.B.E., R.A.N., the last commanding officer of this squadron, was struck on May 5, 1931, on board the Marlborough at Devonport, on which date the Marlborough was transferred to the administration of the Commander-in-Chief at Plymouth and the squadron ceased to exist. It had for some months previously consisted of the flagship only.

The only other change affecting capital ships of the Royal Navy was the return of the Hood to service after an extensive overhaul at Portsmouth. The Hood was completed to full crew on May 12, 1931, for service as flagship of the Rear-Admiral Commanding the Battle-Cruiser Squadron, in place of the Renown. Shortly before, the Tiger had been withdrawn from this squadron to be scrapped. Apart from the ships used for the sea-going training of boys, there was, therefore, no change in the number of British armoured ships in commission during the year. The Atlantic and Mediterranean Fleets each had five battleships. In the former were the Nelson, Rodney, Malaya, Valiant, and Warspite; and in the latter the Queen Elizabeth, Resolution, Ramillies, Royal Oak, and Royal Sovereign. The three battle-cruisers Hood, Renown, and Repulse remained in the Atlantic Fleet. One battleship from each of the Fleets, the Barham and the Revenge, was taken into dockyard hands for refit.

The completion of the Exeter in July, 1931, enabled the Second Cruiser Squadron, Atlantic Fleet, to be composed entirely of post-Washington ships carrying 8-in. guns. The Hawkins was withdrawn to the Reserve at Portsmouth. The changes in the cruisers

on foreign stations followed the ordinary routine. The Colombo replaced the Caledon in the Third Cruiser Squadron in the Mediterranean, and the Cardiff became flagship on the Africa station in succession to the Calcutta. Concurrently with the drafting of the Durban to the America and West Indies station, to take the place of the Despatch (which was succeeded as flagship of the Commander-in-Chief by the Delhi, already on the station), an interesting change in organisation was made. It was decided that two of the cruisers of the Eighth Squadron should form a South American Division of it, under a Commodore, second class. These vessels will cruise in South American waters, but will rejoin the main division of the squadron annually for exercises. The Durban completed to full crew at Chatham for her new service on September 1, 1931, on which date Captain R. H. O. Lane-Poole, O.B.E., hoisted his broad pennant as Commodore Commanding the South American Division in her.

Torpedo and Small Craft.

The completion of the Keith and the "Beagle" class destroyers in the spring of 1931 enabled the Fourth Destroyer Flotilla in the Mediterranean to be reconstituted. The Broke and vessels of the old Fourth Flotilla returned home in April, after the combined fleet exercises. The Broke relieved the Keppel as tender to the R.N. Engineering College at Keyham. The Keppel and "W" class destroyers from the Fourth Flotilla were ordered to China during the winter of 1931–32 to replace the "S" class vessels in the Eighth Flotilla which are due for scrapping in 1932. The new Fourth Flotilla for the Mediterranean left Portland on July 18 for Gibraltar to take up its duties.

Of the four sloops built under the 1929 programme, the three which were completed in 1931 (Fowey, Shoreham, and Bideford) were allocated for duty in the Persian Gulf Division of the East Indies station, replacing the Folkestone, Penzance, and Hastings respectively. The relieved ships were transferred, the Folkestone to China to replace the Magnolia, which was scrapped; the Penzance to the Red Sea to succeed the Lupin, which was withdrawn to the Reserve at home; and the Hastings to the Red Sea to relieve the Dahlia, which was placed on the sale list. The Rochester, when completed about the end of March, 1932, will relieve the Cyclamen on the Africa station.

After various delays the submarines Orpheus and Phœnix left Portsmouth on June 16, 1931, and arrived at Hong Kong at the end of August, thus completing the reconstitution of the Fourth Submarine Flotilla with post-War vessels. The "R" class submarines of the 1928 programme were allocated to the Mediterranean, and proceeded there at odd intervals. The Rover left Portsmouth without escort on August 15 and arrived at Malta on the 26th. The Regent left Portsmouth on October 12 and arrived at Malta on the 24th. The Regulus followed later. The First Submarine Flotilla in the Mediterranean also received during the year the Oxley, Otway, and Oberon. The two former vessels had been transferred from the

Royal Australian Navy, and arrived at Malta on July 23 from Sydney. The Oberon left Devonport on June 24 and joined up with the Fleet at Argostoli on July 6.

Foreign Fleets : Home and Atlantic.

The French naval forces in sea-going commission in the Channel include nothing above the size of torpedo craft. Attention was particularly drawn to this during the visit paid to the Baltic in the summer of 1931 by Rear-Admiral Laborde, with the flotilla leaders Bison and Lion. As flagship, the former vessel was unfavourably compared at the international meeting at Riga with the British cruiser Dorsetshire and with the German cruiser Königsberg. Although the fastest and in some ways the most remarkable unit present, the little Bison lacked something in prestige. The French Second Squadron, based on Brest, includes, besides the Bison as flagship, the 4th Light Division (Vauban and Lion); the 2nd Destroyer Flotilla (L'Adroit and twelve destroyers); and the 4th Submarine Flotilla, with certain auxiliaries. A cruiser would be welcomed as flagship in the Second Squadron, but the scarcity of this class in the French Navy does not permit of this at present.

Numbers of small craft, chiefly for training purposes, are attached to the First Maritime Region, Cherbourg, and the Second Maritime Region, Brest. At the latter base there are in reserve the battleships Diderot, Voltaire, and Provence (the latter under refit), the cruisers Strasbourg, Metz, Mulhouse, and Jeanne d'Arc II., and several smaller vessels, including the leaders Leopard and Lynx. The Training Division at Brest includes the minesweepers Etourdi, Mutin, and Conquerante; and there are five dispatch vessels of the "Meuse" type attached to the Permanent Minesweeping Commission.

The German naval forces in the North Sea and Baltic include four battleships—the Schleswig-Holstein (flagship of the Commander-in-Chief), Schlesien (flagship of the Battleship Force), Hessen, and Hannover. Four of the new post-War cruisers are also in commission—the Königsberg (flagship of the Commander-in-Chief, Scouting Forces), Köln, Karlsruhe, and Emden, of which the two last-named are employed as training cruisers under the Inspectorate of Training. Also in the Scouting Forces there are the First Destroyer Flotilla (eight older vessels, with the T.196 as leader); Second Destroyer Flotilla (nine new vessels, with the Seeadler as leader); and a Minesweeping Force.

Northern Europe.

Under the Estimates for 1931–32 Denmark retained in permanent commission only one coast defence ship, the Niels Juel, and a submarine division; but a Training Squadron was formed during the summer of 1931 with the Beskytteren as flagship and including torpedo boat, submarine, and mining flotillas. During the summer months Norway has in commission, in the Horten District, three or four coast defence ships, one of which, the Norge, is used as a

training ship for cadets and recruits; and torpedo boat, submarine, and mining forces. Other small craft are stationed at Bergen and Christiansund.

Sweden maintains a Coastal Fleet (April to October) consisting of an armoured ship division (the Gustav V, as flagship, and the Manlighten and Drottning Victoria), a destroyer flotilla, and two vedette boat flotillas. The active submarine flotilla includes six vessels; the Svea serves as depot ship; and there is a signal school division of three units. There is also a transport division, with the Freya as depot ship; an air division, in which is the coast defence ship Dristigheten, and the torpedo gunboat Jacob Bagge; and a transport division and training vessels.

Spain and Portugal.

The revolution in Spain, besides affecting the names of certain ships of war, has also had its influence to a lesser extent on their disposition. Battleships no longer figure as part of the Sea-going Squadron. There are two cruiser divisions of this force, the first consisting of the Miguel de Cervantes (flagship), Libertad, and Almirante Cervera; and the second of the Republica (flagship), Mendez Nunez, and Blas de Lezo. In the destroyer flotilla are the newest leaders, the Sanchez-Barcaiztegui, Jose Luis Diez, and Almirante Ferrandiz; and the destroyers Alsedo, Velasco, and Juan Lazaga. Ships under the direct orders of the Admiralty are the Cataluna, the despatch vessel Giralda, and [illegible]tain auxiliaries. The battleships Jaime I and the Espana (ex-Alfo[illegible]III) are at Ferrol in reserve, with three gunboats and other sm[illegible]ther gunboats, torpedo boats, and auxiliaries are in reserve a[illegible]artagena there is the cruiser Extremadura, flotilla leader Le[illegible]estroyer Cadorso, and certain small craft; and at Barcelona there are the Rio de la Plata, the seaplane carrier Dedalo, two torpedo boats, and three motor launches, all attached to the Naval Aviation School.

In the Portuguese Navy there is in commission an instructional division composed of the sloop Carvalho Araujo (ex-British Jonquil), the transport Gileano, and the training-ship Sagres. The sloop Republica (ex-Gladiolus) is in reserve. Other vessels in commission include five gunboats, four destroyers, six torpedo boats, three submarines, and certain auxiliaries.

Fleets in the Mediterranean.

The First Squadron of the French Navy includes four battleships (as compared with six last year), none of which is in full commission. The first division of three ships (Provence, Bretagne, and Lorraine) is manned by four-fifths' crews; and in the second division there is now only the Jean Bart in reserve commission. The Lorraine flies the flag of the Commander-in-Chief, having relieved the Provence, which is refitting. Attached to these divisions of the line are the new cruiser Colbert and the aircraft-carrier Bearn. Then there are two cruiser divisions, all the ships in which carry seaplanes—the first

light division includes the Duquesne (flagship), Suffren, and Tourville, and the second light division the Primauguet (flagship), Duguay Trouin, and Lamotte Picquet. The Foch was to join the first light division on completion. There are also in commission the fifth and seventh light divisions, composed of flotilla leaders of the Panthère and Verdun types respectively. The destroyer forces, of which the Jaguar is flagship, include two flotillas instead of the former three flotillas; the first has the Amiral Senes and nine destroyers; the third the Tempete and seven new destroyers of "Le Fortune" type. Also under the Admiral of the First Squadron is the third submarine flotilla of five vessels.

The instructional division is likewise attached to the First Squadron and is based on Toulon. In this the battleship Paris has relieved the Condorcet as flagship of the Rear-Admiral, and serves as training ship for torpedo ratings and electricians. Cruisers of the division are the Gueydon, Thionville, Ernest Renan, and Jules Michelet, the last-named serving as a schoolship for mechanicians and stokers. Other units of the division are the 13th (Fast Mine-sweeping) Flotilla, with the Intrepide as leader, and the sound signalling group of five vessels. Two despatch vessels, the Baccarat and Montmirail, and the armed yacht Diana, form the Levant Division. Various flotillas of torpedo craft, despatch vessels, and submarines are attached to the 3rd Maritime Region, Toulon, and the 4th Maritime Region, Bizerta. There are naval air stations at Berre, Hyeres, and Bizerta.

The Italian Fleet.

The First Squadron of the Italian Navy, based on Spezia, with the Tyrrhenian Sea as its normal cruising ground, has as its principal unit the first division, consisting of the new cruisers Trieste and Trento. In the squadron, too, are the first destroyer flotilla, composed of the Pantera and eight other flotilla leaders; and the seaplane carrier Miraglia. A new third division has been constituted, composed of the new cruisers Giussano and Barbiano, with a destroyer flotilla of nine units in commission and three in reserve. The submarine force includes the Pacinotti as flagship, with five flotillas of four or five boats each.

In the Second Squadron, which is based on Taranto and cruises in the Ionian Sea, there are the second, fourth, and sixth divisions. They are chiefly composed of light craft, but the second division has also the only battleships remaining in commission, the Andrea Doria and Caio Duilio. In the fourth division are the Ancona and Taranto, with destroyer and submarine flotillas; and in the sixth division, the flotilla leader Premuda. Italy's Colonial Forces include a Tripoli Squadron, composed of the Cortellazo and Cirene; the Cirenaica Squadron, with the Orsini (stationnaire ship at Benghazi), and Augusta; the Red Sea Division, with the Azio and Arimondi; and the Ægean Squadron, with the Vitturi, Nera, and Marsigli.

In the Greek Navy the First Squadron consists of the cruiser

Averoff as flagship, and three destroyers, the Aetos, Sphendoni, and Thyella. In the Second Squadron are the cruiser minelayer Helle (the ex-Chinese Fei Hung); the destroyers Jerax, Niki, and Aspis; and an oiler. There are also in commission a training squadron and six submarines, the sloop Nautilus (for hydrographic duties), and various auxiliaries. Aircraft are maintained at Tatoi and Phaleron.

The Soviet Naval Forces in the Black Sea during 1931 included four cruisers, the Komintern, Chevonaya-Ukrainia, Profintern, and Krasni Kavkaz. There were also some torpedo and submarine craft, and twenty-five submarine chasers fitted for minelaying. An old destroyer, the Letchik, serves as an aircraft tender.

The Sea Flotilla of the Rumanian Navy includes the Italian-built flotilla leaders Regele Ferdinand I, Regina Maria, Marasti, and Marasesti; the ex-Austrian torpedo boats Sborul, Naluca, and Zmeul; four gunboats fitted for minesweeping; and five ex-Italian motor launches. On the Danube are seven monitors, and various gunboats and armed yachts. Seven Savoia flying-boats are maintained at Constantza.

Eastern Waters.

The Royal Netherlands Navy Squadron in the East Indies includes the coast defence ship De Zeven Provincien, which serves as training-ship at Macassar; the cruisers Java and Sumatra; nine destroyers, the Panter, De Ruyter, Evertsen, Piet Hein, Witte de With, Van Galen, Jakhals, and Lynx; twelve submarines, and various small craft.

The organisation of the Japanese forces in commission remains the same as in previous years, but there have been alterations in the composition of squadrons. The First Fleet consists of the following:—First Squadron, battleships Nagato (flagship), Ise, and Hyuga, and the battle cruiser Kirishima; Third Squadron, cruisers Naka (flagship), Nagara, and Jintsu; First Destroyer Squadron, cruiser Sendai (flagship) and three flotillas of four vessels each; First Submarine Squadron, cruiser Jingei (flagship) and two flotillas of three boats each.

In the Second Fleet the first of the Japanese 10,000-ton cruisers form the principal unit, viz. the Fourth Squadron, composed of the Ashigara (flagship), Haguro, Myoko, and Nachi. The Fifth Squadron consists of the intermediate 7,100-ton cruisers of the "Aoba" class. The Second Destroyer Squadron includes the Kinu as flagship and three flotillas of four vessels each; and in the Second Submarine Squadron there are the Chogei (flagship) and two flotillas of three boats each.

The First Aircraft Carrier Squadron includes the Akagi as flagship instead of the Hosho, which remains in the squadron, and there is an attached destroyer division of four vessels. Various other units are organised independently for attachment to the combined fleets as required, such as minesweepers.

The cruiser Hirado is now flagship in the Yangtze in place of the Tone, which has been scrapped; and the gunboat and destroyer

flotillas are maintained at their former strength. In the Second Foreign Service Squadron the Kuma has become flagship in place of the Kiso, and attached to this force is the Sixteenth Flotilla.

The cruiser Waldeck Rousseau continues to serve as flagship of the Far Eastern Division of the French Navy. Included in this division are six dispatch vessels, four gunboats in the Yangtze, and two gunboats in the West River. Italy maintains in the Far East the cruiser Libia and two gunboats.

The United States Asiatic Fleet has a new cruiser as flagship, the Houston, which has relieved the Pittsburg. The Yangtze Patrol includes eight gunboats, and the South China Patrol, two gunboats. The Aircraft Squadron includes the tenders Jason, Heron, and Avocet. In the Fifth Destroyer Squadron the Black Hawk serves as flagship, with the Paul Jones as squadron leader, and there are three divisions of six destroyers each, the 13th, 14th, and 15th. The Fifth Submarine Squadron, of which the Canopus is flagship, comprises the Ninth and Tenth Divisions. The following changes will take place early in 1932 :—The gunboats Sacramento and Asheville will be added from the Special Service Squadron. There will be withdrawn six destroyers (some from each division), and six submarines of the Ninth Division (S. 30–S. 35). The aircraft tender Jason will be scrapped, and the Langley, from the Scouting Force, will take her place.

The United States Fleet.

Among the changes in the distribution of the United States Fleet since last year are the relief of the Texas as Fleet flagship by the Pennsylvania, and a reshuffling of the cruisers consequent upon the passing into service of new vessels. A reorganisation scheme (described in the previous chapter) has also taken effect. On the Pacific side there is the Battle Force, in which are thirteen battleships—the largest armoured ship force under a single command in any navy. In the Scouting Force, on the Atlantic side, are the new cruisers. No battleships are now in commission with this Force, except the Wyoming and Arkansas for training. The composition of the Cruiser Divisions in the autumn of 1931 was :—Augusta, flagship ; Division Two—Trenton, Marblehead, Memphis, Richmond ; Three—Omaha, Cincinnati, Milwaukee, Concord ; Four—Northampton, Pensacola, Chester ; Five—Chicago, Louisville, Salt Lake City. Early in 1932 it is proposed to transfer Cruiser Division Three to the Battle Force on the Pacific side. Other changes will include the transfer of the destroyers Wickes and Philip from the Training Squadron to the Special Service Squadron (Gulf of Mexico) ; and the relief by the Memphis, from the Scouting Force, of the Rochester as flagship of the Special Service Squadron.

G. H. Hurford.

H.M. CANADIAN DESTROYER SKEENA, 1,328 TONS.

Commissioned at Portsmouth, June 10, 1931.

(By courtesy of the builders, John I. Thornycroft and Co., Ltd.)

CHAPTER IV.

AFTER THE TREATY OF LONDON, 1931.

THE problem of disarmament, though submerged by financial issues of greater urgency, still looms ahead in the Disarmament Conference which is to meet on February 2, 1932.

The London Treaty, ratified by Great Britain, the United States and Japan, left France and Italy outside its borders, and it is not inappropriate to quote from a French writer what is pre-eminently the French view on the agreement reached in 1930 between the United States and Great Britain. " Without a preliminary *entente* on a basis more moral than political, without a reciprocal will of peace and a cordial atmosphere of collaboration, the Anglo-American parity would never have come into being." * This is merely to repeat what the French have consistently maintained, that questions of disarmament must begin with a clearing of the political ground. Between Great Britain and the United States there were no major points at issue, or if there were they were overridden by a reciprocal determination towards a settlement. Between France and Italy there are certain points at issue which may be briefly summarised.†

(*a*) The status of Italians in Tunis, formerly regulated by a Convention of 1896, which was denounced by France in September 9, 1918.

(*b*) The rectification of the frontier in Lybia, Africa.

(*c*) The colonial aspirations of Italy, who desires a free hand in Abyssinia and the ports of Berbera and Djibouti.

(*d*) Questions of anti-Fascist propaganda issuing from refractory Italians in French territory.

(*e*) The relations of Italy with Yugoslavia.

These stood knocking dolefully at the door of the London Conference, and the launching by Italy of no less than five new vessels (two 10,000-ton cruisers and two 5,000-ton) on April 27, 1930, might conceivably be regarded as a gesture not wholly propitious to disarmament.

But the London Treaty remains a solid and substantial piece of work and some of its aspects may be briefly summarised.

The French seeking, as always, for a solution along political lines, persuaded the British to admit a discussion on the problem of security.‡ Pourparlers followed, leading naturally to the old

* Paul Estienny, " Problème de la Limitation et de la Réduction des Armements Navals," 1921–31, 1931, p. 315.

† Estienny, 317.

‡ Estienny, 275.

suggestion of mutual guarantees of security by an engagement of reciprocal assistance. This is France's long suit—the suit of security which she is always seeking to make trumps and which she considers must take precedence of disarmament. Italy asked for parity with France.

On March 16, 1930, hope seemed lost, and to break the deadlock the British Prime Minister asked Italy to express her real needs in definite figures of her own, and to give up the indefinite claim of parity with France. But the Italian Government did not see their way to this. Did not M. Briand at the Washington Conference in his memorable despatch of December 23, 1921, say that France had no objection to parity?

It is as well perhaps, however, to quote his words. "So far as Italy is concerned in the case of light vessels (batîments légers) and submarines we make no objection to her obtaining the same figure as ourselves, but we do not admit the figure she asks for as a base for our own." * This may seem to some an admission of parity, but parity is not so simple as that. There are different sorts of parity. There is "parité par en haut" (top limit parity) and "parité par le bas" (bottom limit parity).†

The distinction is not altogether unimportant. If France fixes her needs and Italy says, "I want the same," that is apparently "parité par en haut" (top limit), and Italy may have that. But if a Conference fixes a lower figure and says to France, "You may have so much" (which may be less perhaps than what she needed), and Italy says, "I will have the same," that is "parité par le bas" (bottom limit parity), and is by no means so acceptable. The distinction, though finely drawn, is real enough, and the essence of the discrimination lies really in a disassociation between the idea of parity and the idea of limitation. Parity without limitation is not the same as parity with limitation. Mrs. A. may say to Mr. A. (who is the trustee of Mrs. B.), "I am going to spend £1,000 a year; Mrs. B. may spend the same (if she has it)." That is "parité par en haut.' But if Mr. A. says, "You are only to spend £500 a year and Mrs. B. may spend the same," that is parity with an imposed limitation and may not be nearly so acceptable to Mrs. A.

Another point that cropped up in the London Conference is that of the "pacte consultatif." On March 25, 1930, the U.S. Government declared itself ready to examine the question of a "consultative pact," that is an agreement to consult with other Powers as to the steps to be taken in the event of a breach of the Covenant or of the Kellogg Pact. But here shoal water was found. A "pacte consultatif" signed in return (comme contrepartie) for a naval reduction might be regarded as implying something of the nature of an assurance of help.

One has only to look back twenty years to see that an implication of this sort was read into the consultations that took place in

* Estienny, 285.

† This distinction appears in the writings of French publicists (e.g. Dr. Paul Estienny, 285), though it is not found in the official blue book "Documents of the London Conference (Foreign Office)," 1930.

1906 over the Algeciras question.* The fact that England allowed herself to enter into military consultations was interpreted by France as half-way to a promise of assistance, and much the same thing happened in 1914. The United States, however, were careful in 1930 to avoid even the possibility of a misunderstanding of this sort. " The United States will not participate in any treaty whether consultative or of any other nature by which, in consequence of a misunderstanding (par suite d'un malentendu), other Contracting Powers would be able to believe that it implies on the part of the United States the promise of guaranteeing to another nation military assistance or protection by military force." The United States accepted discussions of the idea of a Pact of Consultation only on the definite preliminary understanding that it would engage them to nothing.

The discussions went on. In June, 1930, Signor Grandi in the Italian Senate suggested an arrest of naval construction while France and Italy were proceeding with negotiations on the subject of parity. M. Briand replied on July 7, 1930, that the Government of the Republic was disposed to lay down nothing up to December 31, 1930. Rome sent an equally favourable reply, and there ensued a six months' naval holiday (vacances navales), both Powers abstaining from laying down any new construction up to December 31, 1930. The Franco-Italian issue did not come before the Commission Préparatoire, which closed its labours on December 9, 1930.

Mr. Craigie continued, however, to smooth the road towards a *rapprochement*, endeavouring apparently to prolong the " naval holiday " which expired on December 31.

Negotiations continued between France and Italy in conjunction with Great Britain, and in February, 1931, came the memorable visit to Paris and Rome of Mr. Henderson, Secretary of State for Foreign Affairs, and Mr. Alexander, the First Lord of the Admiralty.

Basis for an Agreement (March, 1931).

The outcome was an agreement,† or basis for an agreement (bases d'accord), announced on March 1, 1931.

It covered the following points :—

A. Tonnage under Washington Treaty (1922).
   1. Capital ships, regulated by Treaty of Washington.
   2. Aircraft carriers.

B. Tonnage under Treaty of London (1930).
   (*a*) Cruisers, large gun (over 6·1 inch).
   (*b*) Cruisers, small gun.
   (*c*) Submarines.

With regard to capital ships, France by the Treaty of Washington was allowed a total of 175,000 tons ; under the Treaty of London

* Gooch and Temperley, Vol. III, cf. Grierson to Barnardiston, March 19, 1906, in 3–196, and M. Cambon's efforts to obtain a definite promise of help from Sir Edward Grey, 3–203, 3–180.

† Cmd. 3812, 1931. Negotiations, France and Italy, Naval Armaments. The Memorandum is dated March 11, 1931.

in 1930 she retained the right to 70,000 tons replacement (representing capital ships which she was entitled to lay down, but did not lay down, in 1927 and 1929), and further to replacement tonnage for the battleship France (23,128 tons) wrecked in 1922.

She has six battleships of 133,124 tons,* so that to make up her 175,000 tons she has a margin of 41,866 tons which she can build without any equivalent scrapping. Now to fit into the 70,000 tons replacement which stands to her credit on the replacement side she has designed three ships of 23,333 tons, and in order to permit two of them (46,666 tons) to be built without the necessity of scrapping, it was proposed and agreed that the margin of 41,866 tons should be increased to 46,666 tons. The Washington Treaty limit of 1921 was therefore to be stretched from 175,000 tons to 181,000 tons.

Both France and Italy expressed themselves agreeable to limiting the calibre of their heaviest gun to 12-inch.

Before December 31, 1936, France and Italy might complete 34,000 tons of aircraft carriers.†

With regard to cruisers of the big-gun type,‡ no further construction was to take place after the completion of the 1930 programme.§ This would leave France and Italy each with seven large-gun cruisers.

Of cruisers, small-gun type, it was laid down in the basis of agreement that the tonnage of new construction to be completed should not exceed the tonnage replaceable|| before December, 1936. But instead of small cruisers over age an equivalent tonnage of big cruisers might be scrapped.

Expressed in terms of units, this means that France has four small cruisers (three built and one building), not counting four ex-German ones. The only ones that are over age are the four ex-Germans, totalling some 20,000 tons, so that apparently France, under the March basis of agreement, could build some 20,000 tons, or about four small cruisers, with a scrapping equivalent out of the old "Waldeck Rousseau" class.¶

Italy, on the other hand, has seven small cruisers over age with a tonnage of 28,242 tons,** so that this clause practically meant in the case of small cruisers for France and Italy a limitation of any new building of light cruisers to some four or five.††

* Cmd. 3812, p. 1, but according to Brassey, 1931, p. 310, the "Jean Bart" class are 23,128 tons (Washington tons), which would make six ships of 138,768 tons.

† The tonnage quotas under Washington were for France and Italy 60,000 tons.

‡ Carrying guns over 6·1 inch.

§ France, 1 cruiser of 10,000 tons (Algérie); Italy, 1 cruiser of 10,000 tons (Pola); both ships laid down in March, 1932.

|| That is for age. Under the Treaty of London, the age limit of small cruisers is 20 years for those laid down after December 31, 1919; 16 years for earlier ships.

¶ Armoured cruiser completed 1911, 13,828 tons, 14 7·6 inch; the Ernest Renan and Jules Michelet belong to the same class.

** Brassey, 1931, 318.

†† According to the League of Nations Union, Speakers' Notes, March 1931, the agreement provided that "for light cruisers, 6-inch guns or less, and destroyers, France may replace to a maximum of 198,000 tons and Italy 151,360." It may be noted that France's tonnage in light cruisers and destroyers on January 1, 1930, was 228,897. (Documents, London Naval Treaty.)

No destroyers under 16 years of age were to be replaced before December 31, 1936.

The tonnage of French submarines up to December 31, 1936, was not to exceed 81,889 tons, the present tonnage of under-age vessels built and building. In other words, this meant that no submarines would figure in the French programme for 1931 and 1932. Great Britain added a reservation that she considered the French submarine tonnage figure of 81,989 tons too high, relatively to the British destroyer tonnage of 150,000 tons, but she did not propose to invoke Article 21 of the London Treaty,* pending the general revision of the naval question at the Disarmament Conference of 1932.

These "bases of an agreement" undoubtedly marked a distinctly progressive step in the road of limitation, but difficulties arose in the way of their final acceptance, and two months slipped away without the conclusion of any definite agreement.

The agreement was still hanging fire in May, when Signor Medici del Vascello presented his report † on the Italian naval estimates, which devoted a considerable space to questions at issue in the agreement. The question of a reduction of French submarine tonnage to 52,700 tons seems to have been under consideration, for it was suggested that "if France in compensation for reducing her submarine tonnage to 52,700 tons should be authorised to construct surface vessels *pro tanto*, Italy should be empowered to construct up to the same amount of surface tonnage."‡

On June 3, 1931, Signor Grandi made a speech in the Senate on the failure to reach a naval understanding. He spoke of Italy's "feelings of surprise and disillusion." The telegram received by him on March 2, and signed by Mr. Henderson and M. Briand, "constituted the full unreserved acceptance on the part of France of the basis of accord established in Rome." But in the drafting of the final text, France had put forward a new interpretation which had infallibly led to a grave divergence of opinion.

The Committee dissolved with the procedure—ominous of disagreement—of an exchange of diplomatic Notes, in which the three Governments defined their respective views.§

In France, the Rapport of M. Daniélou issued early in June on the naval programme for 1931–32, stated the points on which the negotiations broke down.||

The Debate took place on June 18, but the full programme did not pass the Chamber of Deputies unscathed. The Government proposals were considerably modified. The Government had asked for a credit of 1,099,960,000 francs (£8,799,680). It was given only 500,000,000 francs (£4,000,000).¶

The circumstances under which the agreement had broken down

* The "safeguarding" or "elevator" clause giving her the right to increase her strength in cruisers, destroyers or submarines.

† Camera dei Deputati, No. 805A. Relazione, 16 Maggio, 1931.

‡ *Times*, May 16, 1931.

§ *Times*, June 4, 1931.

|| Chambre des Deputés, Rapport. *Times*, June 6, 1931.

¶ *Times*, June 19, 1931.

were disclosed. The point of disagreement had arisen over the stipulation that France and Italy would not construct any small-gun cruisers or destroyers before the end of 1936 except for purposes of replacement.* But the question of ships not to be completed till 1937, that is, after the expiration of the agreement, had constituted a point of controversy and had given rise to an acute divergence of opinion. Under the London Treaty, building might be begun before the end of 1936 to replace vessels becoming over age in 1937, 1938 and 1939. France considered, however, that she could only accept limitation up to the end of 1936.†

Reports were current, too, that the French Government not only claimed the right to start in 1935 and 1936 the construction of ships due for replacement in 1937 and 1938, but harboured the intention of laying down 66,000 tons of new construction to come into commission in 1937.‡

This meant that the French Government, instead of limiting all new construction up to 1936 strictly to the figures necessary to replace tonnage becoming over age in 1937, 1938 and 1939, claimed the right to lay down in 1935 whatever small-gun cruisers and destroyers tonnage it might consider necessary for the country's security in 1937. In other words, France, though recognising in the suggested agreement the provisions of Part III. of the London Treaty,§ would only be accepting its terms for four years (1931–34) instead of six.

This was the technical point on which the agreement broke down, though there can be little doubt that the political atmosphere created by the proposal for the German-Austrian Customs Union probably produced considerable political tension.

Italy was still waiting for an answer to her Note in the end of June, when the British Prime Minister made a speech on the coming Disarmament Conference in the House of Commons.¶ For Great Britain there was little room for one-sided disarmament. "The reduction must be all round. We have gone pretty nearly to the limit of example."

The strong current of opinion in Great Britain in favour of disarmament found further expression in a Disarmament Meeting at the Albert Hall on July 11, 1931, where the three Party leaders, Mr. MacDonald, Mr. Baldwin and Mr. Lloyd George, sat beside one another on the same platform.** To the Prime Minister it seemed that the world expected from Geneva not merely resolutions saying that they were all in favour of peace but a reduction of figures. Mr. Baldwin declared his complete agreement, pointing out that our decline to the fifth place in the air armaments of the world "had

* Cmd. 3812, p. 5, ii, B (*b*).

† That is, presumably, in ships to be completed by that date.

‡ *Bulletin of International News*, April 23, in Speakers' Notes (L. of N. Union), May, 1931.

§ Art. 19. "Nevertheless replacement tonnage may be laid down for cruisers and submarines that become over age in 1937, 1938 and 1939, and for destroyers that become over age in 1937 and 1938."

|| *Times*, June 20, 1931.

¶ June 29, 1931.

** *Royal United Service Institution Journal*, August, 1931.

H.M. FLOTILLA LEADER KEITH, 1,330 TONS.

Commissioned at Chatham, June 9, 1931.

(By courtesy of the builders, Vickers-Armstrongs, Ltd.)

been a one-sided disarmament." Mr. Lloyd George struck a note of disillusionment. "Every nation, and there were thirty, great and small, signed the Covenant, and signed it willingly. Did they mean it? Perhaps they did; perhaps they did not." The Disarmament Commission "had been sitting for years and, so far, had hatched nothing." "They all renounced war; but they forgot to renounce preparations for war."

The meeting presented an authoritative pronouncement of British Government opinion. The French view found official expression a few days later in the Memorandum of July 11, despatched to the Secretary General of the League of Nations as a precursor to the coming Disarmament Conference.

Paul Bourget has somewhere drawn a comparison between the articulated reasoning of Descartes and the stormy intuition of Carlyle as representing an essential difference in national modes of thought. On the one side a marshalled analytical argument advancing step by step towards a single goal; on the other a complex disarray of divinatory thought embracing various aims at the same time. French thought, he says, deals with aspect of life as definite realities moving fixedly along certain lines for which abstract principles of guidance are required, while in English thought there is something moving indeterminately towards a wider but vaguer sphere.

This view may or may not be true, but the French regard for principles was clearly discernible in the London Conference,* and is equally evident in the Memorandum. Principles are sought for and laid down, though it is perhaps permissible to regard them rather as principles of polity directed against disarmament than as principles by which any measure of real disarmament can be achieved.

French Memorandum.†

The Memorandum begins by stating that it is desirable to set forth the principles and methods of French policy, and the conditions which it is necessary to fulfil if the hopes awakened by the Preparatory Disarmament Commission are not to be disappointed. Article VIII. of the Covenant is quoted once again: ". . . reduction of national armament to the lowest point consistent with national safety and the enforcement by common action of international obligations."

The French Memorandum then lays stress on Common Action (action commune). "Reduction of armaments will be more substantial in proportion as the setting in motion (déclenchement) of the contemplated common action is less uncertain."

Therefore, before discussing any questions of disarmament, we must begin with the principle of common action. And so the

* ". . . les puissances anglo-saxonnes qui n'attribuent aux questions de méthode qu'un interêt parfaitement sécondaire et qui ne sont pas dérangées pour etablir des principes abstraits." French Delegation, Rapport, Chambre de Deputes, 1930, p. 42.

† French Memorandum, dated July 15, 1931, in *Le Temps*, July 23, in *New York Times*, July 22.

Memorandum goes on—France has been invaded thrice in a hundred years; and for the Fleet it has been so weakened as to be unable to fulfil its normal responsibilities and has had to be built up again by the programme of 1924.

The Memorandum expressed the hope that it would be possible for France and Italy to set forth their intentions of construction for the next few years in a temporary "modus vivendi" to facilitate the work of the coming Conference.

On January 1, 1931, according to the Memorandum, the global figure (chiffre global) of French ships in service and construction amounted to 628,603 tons (Washington), made up as follows:—

Ships of line, subject to Washington Treaty	133,134
,, ,, not so subject	52,791
Aircraft carriers	23,146
Cruisers, 1st class, not including Edgar Quinet, 12,539 tons	124,424
Light vessels	193,233
Submarines	97,875
Total	628,603*

By the sitting of March 1, 1924, the Air Force was to consist of 2,247 machines for the Army and 180 for the Fleet. At present it does not exceed 1,180 planes.

Such are the steps that have been taken voluntarily towards the limitation of armaments.

The Memorandum went on to deal with the question of security.

It reasserted that the reduction of armaments implies confidence (confiance). The problem is not a merely technical one. The entire international situation must undergo a change. A political solution must be found. The General Protocol afforded such a solution in which arbitration, mutual assistance and the limitation of armaments were closely co-ordinated. The Government of the Republic, convinced of the necessity of a security guaranteed to every State by assistance, mutual, effective and prompt, are prepared to extend unqualified collaboration to any system for the general organisation of peace which involves definite pledges of effective mutual assistance (engagements précis d'assistance mutuelle, effective en cas d'aggression).

The Government of the Republic will do its utmost at the Conference of 1932 to assure the establishment of these conditions, without which no real progress can be effected.

Briefly the French Memorandum is a repetition of the principle to which the French Government has consistently adhered, namely, that security based on a Treaty of mutual assistance must precede disarmament.

In view of the refusal of America to enter into any European engagements and of British pronouncements † on the same point, it is difficult to hope for any wide measure of solution along these lines.

The Memorandum had barely been published when Germany's

* This compares with 681,808 tons (English) on January 1, 1930. London Naval Treaty Documents (F.O.), 1930, p. 540.

† Prime Minister's Broadcast of March 9, 1930, and British delegation's communication to the Press on "No new Military Engagements," March 30, 1930.

financial difficulties came to a head followed by the British crisis in the end of August.

Negotiations still continued, and early in September France despatched a new Note to Italy, stated to contain a suggestion for a new standard based on the respective naval construction of the two countries during a series of years.*

Then came the opening of the Assembly at Geneva, where an address by Signor Grandi, on September 8, included an appeal for a "real effective truce in armaments," at least until the end of the Disarmament Conference, and a strong protest against systems of alliance in Europe which were contrary to the spirit of the Covenant, and were nothing more than a recrudescence of the old system of balance of power. On these points M. Briand in his address had nothing to say.†

All that can be said is that the negotiations have not broken down, and though the stream along which they run would appear hardly deep and wide enough for peace cargoes of any size, it is possible that something may be brought safely to port.

But the general situation of 1930 was not the general situation in October, 1931. The financial storm had changed the landscape of international polity and the big problems were revolving outside the orbit of naval polity. There was Manchuria, too. The Assembly adjourned on October 24 without discovering a solution for it. Japan stands for the fulfilment of Treaties—a standpoint she shares in principle with France. M. Briand's Note of November 7 had urged the two Governments in the Far East not to aggravate the situation, and that was all. It will compromise the dignity of the League to start a controversy with far distant Powers too powerful for it to influence. To the suggestion offered by the League for a truce in armaments to November, 1932, not to include the regular execution of programmes laid down, all the Governments invited to the Disarmament Conference have signified their assent.

Momentous visits have been made across the Atlantic. M. Laval has met Mr. Hoover and returned with an understanding that America will cease to urge disarmament on France. "France will remain mistress of her own security." ‡ Signor Grandi has gone on the same journey. Meanwhile the key of financial polity seems to be in the hands of France, and its influence will possibly be felt in any deadlock at the Disarmament Conference.

So far as navies are concerned a very considerable degree of disarmament has been effected by all the principal Powers, and a large measure of agreement has been reached with regard to methods of measurement. It is rather in the sphere of land forces that acute differences of opinion may arise.

The question of whether the hen came before the egg or the egg before the hen—in other words, whether security leads to disarmament or disarmament evokes security—has been solved for France. She believes in security. She is impervious to the river of propaganda

* *Times*, September 2, 1931.
† *Times*, September 9, 1931.
‡ M. Laval, Nov. 1, in the s.s. Ile de France.

which flows in an unceasing stream in the Anglo-Saxon countries.

A malarial mist of ill-feeling may rise from this stream of fervent pacificism. The hot gospeller of "disarmament first" is bound to feel displeased with the stern exponent of "security first," and the ill-feeling evoked may be antagonistic to peace. The Frenchman is entitled to his opinion. He does not believe that we are living in a new world. In return for any step in disarmament he asks for an equivalent degree of security in the form of a collective guarantee. On the other hand he must be fully alive to the fact that new weapons of destruction have terribly increased the ravaging power of war, and any sane degree of disarmament that tends to achieve a friendlier feeling must be for the good of the world. Towards this goal the Admiralties of all the principal Naval Powers have in the last ten years made a notable contribution.

Alfred C. Dewar,
Captain, R.N.

CHAPTER V.

The Accountant Branch of the Royal Navy.

The Accountant Branch of the Royal Navy has come into some prominence lately, owing to the introduction in H.M. Ships of a new system of victualling the ship's company, known as General Messing, and of a new method of accounting for naval stores through central storekeeping. Its personnel is in closer touch than before with the daily life of the ship. Also, it seems to be generally recognised in the Navy that the new office of Paymaster Director General in the Admiralty, which co-ordinates the efforts and ideas of Paymasters, has brought more naval influence to bear on questions of administration concerning the internal economy of the Navy.

The range of responsibility confided to Paymasters is as follows, and in no other Navy do Paymasters carry out all these varied duties :—

(A) Pay and Wages. (B) Victualling. (C) Uniform clothing. (D) Naval Stores. (E) Secretary to Captains. (F) Secretary to Flag Officers. (G) Judge Advocate and Legal disciplinary work. (H) Cypher Office.

The controlling idea in the Royal Navy of allotting so extensive a sphere of work to Paymasters is to release the personnel of all the other branches, the Military, Engineer, Medical, etc., from work extraneous to their respective professional and technical duties.

Historical Review.

An historical review of the branch is of much interest. Pursers, the predecessors of the Paymasters, up to 1814 received casual appointments only, and were classed as Warrant Officers. They first wore uniform in 1807. Until 1825 the usage of the Service was to pay no wages on board ship, a settlement being made by officials of the Pay Office from London after the ship's charges had been calculated. In 1825 the Purser commenced to act as agent for the Admiralty by making monthly cash advances to the men. Until 1852 he was chiefly employed on the ship's victualling and the issue of necessaries, with charge of clothing, soap, and tobacco; but afterwards he had to supervise and account for Government stores, and from being a somewhat independent agent, he became as paymaster a storekeeper on behalf of the Crown. Until 1877 the Paymaster was under a personal bond amounting in first-class ships to £700, and in his accounts he was responsible to the Comptroller of Victualling. He first became an accountant on behalf of

the Accountant-General in 1853, and Printed Instructions were then issued for his guidance. Apparently the title of Purser was changed to Paymaster in consequence of the officer having more and more duties to execute in connection with pay and wages. There has always been a combined responsibility of the Captain and the Paymaster for the welfare of the ship's company and the due rendering of the ship's accounts to the Admiralty for examination and audit.

THE GROWTH OF RESPONSIBILITY.

As the result of assuming new responsibilities, the status of the branch has been raised periodically. By an Order in Council, July 22, 1814, pursers were granted a rank "with but after" Lieutenants, in official words "in order to give them a greater respectability." Some degree of permanency in employment also was granted, while only Secretaries' clerks and Captains' clerks were eligible for appointment as Purser. The union of the two main divisions of work carried out by the Accountant Branch was then first officially confirmed.

Greater integrity, stricter accountancy, and higher efficiency have been the natural results of improved conditions of service granted to the personnel. On October 3, 1918, by an Order in Council, Executive titles with the Paymaster prefix and Executive uniform with the white distinctive stripe were conferred upon the officers of the Accountant Branch in common with those of the Medical and Instructor Branches.

The revised conditions of pay and service introduced into the Navy in 1919 benefited the junior officers of the Accountant Branch considerably, but under them the senior officers of Captain's rank are not so well off relatively as previously. In this respect the Accountant Branch may be said to have suffered a set-back.

THE PAYMASTER'S STAFF.

The staff of the Paymaster consists of writer and supply * ratings, who are well-educated, long-service men, and they render excellent service. They too have gained improved prospects, and are now eligible for promotion to Paymaster Lieutenant-Commander through warrant rank. The mate system of advancement has not met with favour in the Accountant Branch.

More and more responsibility devolved upon the Paymasters as the era of steam power developed, because as H.M. ships worked from bases instead of pursuing a wandering commission under sail, it became simpler and more economical to have accountant work done on board ship and in naval bases under the Naval Discipline Act, instead of in Government Offices at Whitehall, or in H.M. Dockyards. When the work of the Navy pay agents ceased, it was the Paymaster who took over the calculation and payment of the naval officer's pay, including the deductions of income tax.

* Formerly Ships' Stewards.

Payments and Allotments.

The present method in the Navy is to calculate pay and wages on the ship's ledger, which is closed quarterly and sent to the Accountant General for audit. Fortnightly and monthly payments are made in home waters, and monthly payments on foreign service. All pay and wages accounts are settled quarterly between officers and men and the Paymaster. To dependents the seamen's allotments and the marriage allowances are paid weekly through the Accountant General of the Navy on the advices of the Paymaster. The allotments are charged on the ledger, but not the marriage allowances, which are accounted for separately by the Accountant General. This work, with that of paying remittances and allotments as authorised by the Paymaster, are the remaining items of actual naval pay work which are carried out by Civil Servants. The payments are made through the Post Office.

The suggestion has been put forward that this work should now be transferred to the Accountant Branch in logical sequence of what has happened in the history of naval accountancy. It would probably be carried out more economically at the home naval depôts, where there is as much permanency in administration as at the Admiralty. If the marriage allowance could be paid through the ship's ledger, it seems that its accounting would be simplified, which means carried out more economically. Incidentally, each man's total emoluments would appear on the ship's pay book, which is not the case at present.

Control of Victualling.

The control of victualling in the Navy has long been in the hands of a Civil Service department, at the Admiralty, under a Director of Victualling, who also administers the naval victualling yards at Deptford, Gosport, Plymouth, and at naval bases abroad such as Gibraltar, Malta, Hong-kong, etc. None of the officials from the Director downwards is drawn from the ranks of those who have practical knowledge of naval life or sea conditions. They are therefore at a disadvantage in dealing with the needs of the Service in regards to the victuals, uniform, clothing, and other items which the department supplies to the Fleet. Until recently the Paymasters' victualling duties were to purchase fresh meat and vegetables when these could not be obtained through the victualling yards, to receive victuals from these yards for the men's messes according to scale, and to calculate and pay savings. Each Paymaster was an isolated unit, his opinion was not asked, and it would have been perhaps venturesome of him to have offered one.

When the writer entered the Service in 1888 the victualling was definitely behind the times, the daily ration was an incomplete diet, and though savings—money in lieu of provisions, allowed to but not wanted by the men (considered to be the safety-valve of the victualling system)—were paid, no adequate facilities were given to the men to obtain with the cash the fresh food which was necessary

to supplement what the Service provided. Bum boats were allowed alongside, as they always had been, and private canteens, run by the ship's company, were permitted on board. It was amateurish and inefficient, while irregularities, both in supply and accounting, were frequent. Not until 1907, following the report of an Admiralty Committee, was the first radical overhaul of naval victualling made in later times.

Standard Ration.

In 1907 the changes made were savings commuted into messing money—a matter of accountancy, as also was the new form of issue of food on repayment—some new kinds of food added to make a Standard Ration, supervision of canteen tenants, and the kitchens placed under the control of the Paymaster. This latter was a really important alteration, as the cooks became part of the Paymaster's staff; preparing rooms were added to the ship's galley to give facilities for making up the dishes by competent cooks instead of by the cooks of messes, who, incidentally, became available for general ship's duty. Bread was baked on board as soon as bakeries could be installed, and, at times, even in the ordinary ovens of the galley under the new inspiration. The provisions which are supplied by the victualling yards are of excellent quality.

The Standard Ration system of victualling stood the strain of the war very well, except with regard to the canteen supplies of articles of fresh food, and it is in force to-day except where replaced by General Messing.

What actually kept the Navy backward in its victualling all those years was the lack of supply of certain kinds of food which the men wanted and really needed, such as eggs, cheese, bacon, margarine, butter, fish, fruit, etc. The risk of loss in such articles of perishable food appears to have so influenced the Victualling Department, that no official source of their supply is or has been available in the Fleet.

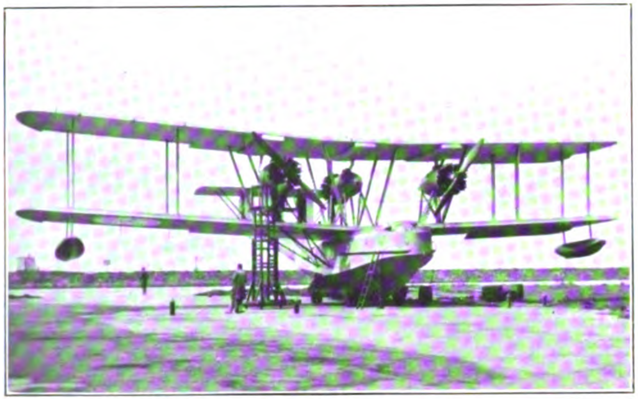
The efforts made on board ship in peace time to ensure the supply of these victuals broke down under the war strain, when the private firms, who were canteen tenants after 1907, were unable to fulfil their contracts. The responsibility for its supply was confided to the Army and Navy Canteen Board, a semi-officially controlled outside trading organisation, which since the War has developed into the Navy, Army, and Air Force Institutes.

General Messing.

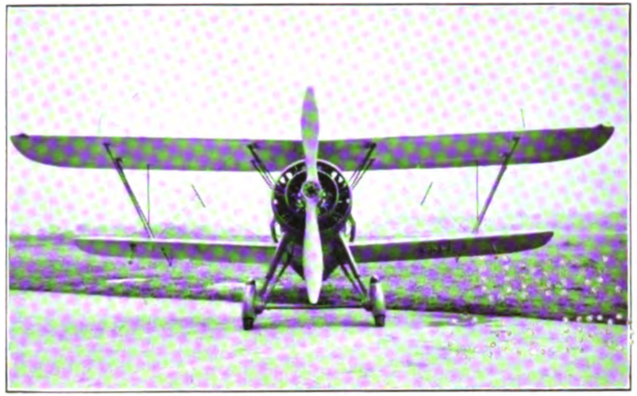
Since the War the co-ordinated efforts of the Paymasters have assisted the Victualling Department, through the office of the Paymaster Director General, one of whose duties is to co-operate with the Director of Victualling. General Messing, which existed previously only in the R.N. Barracks, is now successfully carried out in the majority of H.M. Ships. In this system the Paymaster is directly responsible for the efficient messing of the ship's company. He provides the men with meals in lieu of rations only. As the rations

THE SHORT "RANGOON" FLYING BOAT.
Short Bros., Ltd., Rochester.

THE "SINGAPORE" MARK II. FLYING BOAT.
Short Bros, Ltd., Rochester.



THE "IRIS IV." FLYING BOAT.
Blackburn Aeroplane Co., Ltd., Brough, Yorks.



THE A.W. XVI. FLEET FIGHTER.
Armstrong Whitworth Aircraft, Ltd., Coventry.

and messing and victualling allowances are pooled, the money granted by Parliament under Vote 2 (Victualling Sub-Vote) goes further than it did; with the result that the men are far better fed than under the Standard Ration system. The dishes are prepared by trained cooks under the supervision of the Paymasters, who themselves have undergone instruction in a Cookery School. The bakeries on board ship provide excellent bread. The advice of the Paymaster is given to the naval constructors as to the requirements of the Service with regard to culinary facilities, and in modern ships the kitchens are of the latest type, designed for cooking meals for large numbers. The preparation and cooking of the men's food has been given its proper importance. As a cook rating could formerly only rise to Chief Petty Officer, while now he can attain ward room rank, presumably the work of the ships' cooks must have improved considerably to justify so great an alteration in their status. It is important to note that in addition to having better meals under General Messing, the seamen and marines do not have to supplement their fare as they used to, and still do under the Standard Ration system, through monthly cash contributions to a mess caterer. The British Navy has adopted a reasonable system of messing which the younger navies appear to have had since their inception. The sustained efficiency of General Messing, however, depends on the constant vigilance of the Paymasters, as it is not so automatic in its working as the Standard Ration system which it replaces.

Central Storekeeping.

Further additional work and increased responsibility have been given to the Accountant Branch in connection with Central Storekeeping. Prior to their being placed in the keeping of the Paymaster, naval stores were in the charge respectively of the Engineer Officer, the Boatswain, Gunner, and Warrant Shipwright (formerly the carpenter), these officers being the users as well as the keepers of the stores, and in the case of the Warrant Officers, under the supervision of the ships' executive officers.

Formerly consumable stores were drawn according to a fixed establishment which laid down the annual allowance of each article for each class of ship. Stocks at foreign yards were maintained, and estimates generally were calculated on this automatic basis. Ships whose allowance of some necessary articles had often been inadequate were frequently found on paying off to have one or two years' supply of certain seldom-used articles which had deteriorated or become obsolete—a wasteful and inefficient system. To prevent accumulation of unnecessary stores and to maintain effective financial control it was decided to follow the example of the United States Navy, and to substitute a "money value" for a "fixed establishment" of consumable stores for each class of ship, the ships' total allowance being subdivided into proportionate quarterly sums for the executive, engineer, gunnery, torpedo, and shipwright officers. This system entails a detailed account of the value of all issues to

these departments being kept and communicated to them each week in order that they can be held responsible that their allowances are not exceeded except in special circumstances. All this detailed accounting, and the whole responsibility for drawing, maintaining, custody, and issue of stores have been taken over by the Accountant Branch.

When the expenditure of consumable stores has been valued out in each ship, the flag officer of each squadron reviews quarterly the returns of comparative expenditure of stores by ships under his command. The system ensures the supply of stores that are wanted, but unnecessary stores which used to be allowed by an obsolete scale of allowance are no longer drawn; the direction is active where formerly it was passive, and elasticity provides for emergency requirements.

The credit of initiating Central Storekeeping in H.M. Ships belongs primarily to the Naval Store Department, that of organising and administering it on board ship to the Paymasters. Certain Naval Store Officers are given the duty of liaison officers with the Fleet as far as Central Storekeeping is concerned, and their valuable assistance has played a predominant part in the success of the system. This close co-operation, combined with the method of local audit on board the ships and the fitting of storerooms, etc., in a manner in keeping with modern times, has set the system on a firm and satisfactory basis.

It has been estimated by the Admiralty that in the financial year 1922–23 the sum of £100,000 was saved to the Crown through Central Storekeeping. The value of consumable stores reduced in each capital ship was said to be £2,000 a year, and in a light cruiser £1,000; the total sum saved from 1922 to 1927 was said to have been £500,000. Economy continues, and it is fairly certain that the above estimate was well below the fact, and that a comparison made with the present date would reveal figures of saving that are still more startling.

Clothing, Soap, and Tobacco.

The issues of clothing, soap, and tobacco to the seamen are now made for cash instead of being charged on the ship's ledger. The cash system was experimentally tried at the Royal Naval Barracks, Chatham, during the War, in order to speed up issuing and accounting, and was so successful there that the Paymaster Director General was able to obtain the Board's approval for its universal introduction into the Fleet. The change has greatly simplified clothing issue work, and has benefited the men through increasing the number of occasions on which clothing can be obtained. It is more economical than the method it replaced, while the abolition of the old system of charging "slops" on the ledger has removed the chance of a recurrence of the errors which were sometimes connected with it.

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Exceptional Duty during Wartime.

The writer has not space in this article to do more than refer to the combatant posts which some of the personnel of the Accountant Branch filled during the War, when Captains in some ships confided important duties in the ship's fighting organisation to Paymasters.

During the late War, also, several appointments were filled by Paymasters at the Admiralty, the most important one being that of Organising Manager of Convoys, which was created and held by Fleet Paymaster H. W. Eldon Manisty. In this highly responsible post, when the nation was fighting against the growing success of the enemy's submarine effort to destroy our merchant shipping, this officer had to exercise executive control to a high degree, and the success attained by him has been borne witness to by Admiral of the Fleet Earl Jellicoe, and, also, is now on permanent record in the latest volume of the History of the Naval Operations. Paymaster Rear Admiral Manisty became in July, 1929, Paymaster Director General at the Admiralty.

The Secretary's Office.

During some period of his career, each Paymaster gains experience of the administrative duties of the senior officers of the Military Branch. As Captain's Secretary a junior officer finds himself in a responsible position in the ship's organisation. Early responsibility is placed on the youth, much akin to that given to junior executive officers when placed in charge of a boat's crew. There is similar administrative work, though not always so personal in relation to the executive officers, when the junior Paymasters are serving in Admiral's offices. The custom of a flag officer selecting his secretary from the list of Paymasters is time honoured—something similar obtained in Nelson's days—and as the Paymaster is allowed the privilege of acceptance, the appointment is personal as well as official. Frequently a Paymaster will serve as Secretary to an Admiral in several successive commands, while occasionally the officer follows the fortunes of his chief from those early days when he first served under him, *nolens volens*, as Captain's Secretary.

The full nature and value of the duties performed by an Admiral's Secretary can only be inferred, as, in addition to his official capacity, he is one of the Admiral's personal staff. It is, however, significant that during the unprecedented stress of the Great War the Sea Lords first brought their Naval Secretaries to the Admiralty, and after thorough trial of having these officers with them, with their varied knowledge of the sea service and naval administration, the arrangement is still in force.

The office of Deputy Judge Advocate of the Fleet is held by a Paymaster Captain, who assists the Judge Advocate and also acts as legal adviser in Courts Martial at the home ports and in prominent ones elesewhere. When his services are not available, the Secretary to the Admiral Commanding, or one of his staff, usually acts as officiating Deputy Judge Advocate, but every Paymaster is

qualified for the duty. The Paymaster first approaches naval legal work as Captain's Secretary in connection with summary punishments, punishment warrants, and when assisting in drawing up the circumstantial letter, summary of evidence, and other documents included in an application for Court Martial. He also assists at Courts of Inquiry.

The work of the Captain's is of rather a different type from that of the Admiral's Secretary. The Captain's Office is an important factor in the ship's organisation, and is the centre from which all written orders and information generally emanate, or are distributed. He is thus brought into personal touch with all officers and senior ratings who have any independent responsibilities in the ship's organisation.

All questions concerning the personnel and discipline, with the necessary records and the checking that decisions given are in accordance with existing Regulations, are part of the routine work, in addition to the daily work of correspondence, reports and orders, and circulation of all necessary information to the officers and departments concerned. The Captain's Secretary also collects the necessary information from the appropriate ship's officers for the compilation of the various reports and returns, and attends when men appear before the Captain for Requests or as Defaulters. The men's service records are kept in this office.

As a principal subject of the various examinations for promotion in the Accountant Branch is knowledge of the King's Regulations and Admiralty Instructions, the variety of the call upon the young officer can be understood. The Paymaster Lieutenant also acts as an Officer of Division.

The Paymaster To-day.

Apart from the fact that as the result of assisting in a staff and secretarial capacity in the administrative duties of flag and commanding officers the Paymasters gain a working knowledge of the Navy from truck to keelson, it is reasonable to assume that the latter day increase in their work and responsibility as Accountant Officers of the ships has had a marked effect on the efficiency and capacity of the branch as a whole. The officers acquire unique and varied experience afloat, and are brought into close touch with the supply departments ashore with which they have to deal. Such training from early youth, and such experience gained in hard, practical conditions under ever-changing circumstances produce many officers who are fitted for higher positions of control than are at present available for them. It has long been felt in the Service generally that senior officers of the branch should, if possible, be employed in a directive capacity. As the control of ship's accountant and victualling work is, however, maintained strictly through the medium of the Civil Service, there are no such openings for Paymasters, because they are naval officers. The Board of Admiralty, however, realising the need of having the co-ordinated opinion of the Paymasters to refer to, and of the branch having its chief similarly to

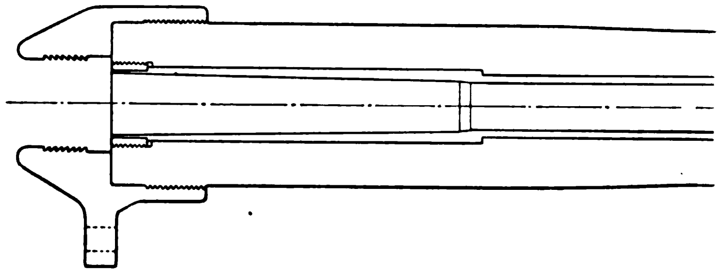
other branches, created in 1918 the new office of Paymaster Director General, and promoted an officer to the rank of Paymaster Rear Admiral to fill it. His duties are to assist the Second Sea Lord in the administration of the personnel of the branch, and to advise the Fourth Sea Lord on questions connected with the accountant work of the fleet. For the first time a Paymaster was called into the counsels of the Admiralty in a definite administrative and advisory rôle. This new influence is of a vitalising nature as regards secretarial duties, victualling, supply, and pay and wages. The establishment of the new department at the Admiralty was the essential preliminary to effecting the reforms which have since been made in the internal economy of the Fleet.

Present Conditions and Prospects.

In the Accountant Branch promotion is now by selection to the ranks of Commander and Captain, where recently it was by seniority, on the principle of permanency of employment. The efficiency of the branch has been improved in consequence, but the compensation which goes with promotion by selection in the Executive Branch —employment in Admiral's rank—is withheld from the Accountant Branch, except in the solitary instance of the Paymaster Rear Admiral, whose appointment as Paymaster Director General is made once every three years. The remainder of the Paymaster Captains are compulsorily retired at the age of fifty-five on Captain's pensions, and other officers are retired at forty-five and fifty, when of Lieutenant Commander's and Commander's rank respectively. The old principle of permanency of employment, by which all Paymasters could serve until the age of sixty has been discarded; a radical change has thus been made in the conditions of employment, and only time can show what effect, if any, will ensue from it in the branch.

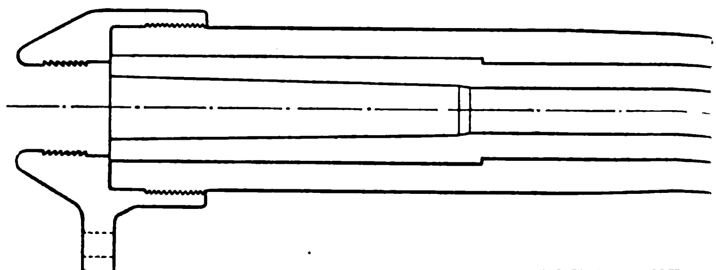
It can be said without reserve that the Accountant Branch, which is such an important factor in naval polity, offers an attractive prospect to youngsters to whom a sea life and travel appeal. It affords an assured and responsible position with scope for considerable and useful individual activities. The examination for entry as Paymaster Cadet is the same as for the Public School entry into the Military Branch, and the Cadets of both branches serve together in H.M.S. Erebus, the Cadets' training ship, for a period of six months, where they undergo disciplinary training and technical instruction. The age at entry is as late as seventeen to eighteen, which allows the youths to enjoy the benefit of a sound scholastic education prior to becoming naval officers.

Alfred C. Ransom, C.B.E.
Paymaster Rear-Admiral, Retired.



GUN WITH

CLEARANCE BETWEEN LINER



GUN WITH

CLEARANCE BETWEEN BARR

CHAPTER VI.

Recent Changes in Designs of Naval Guns.

In the last two or three years the most marked feature in development of gun design has been the general introduction of designs permitting repair of worn guns on board. Otherwise, there has been little change. The United States have, however, struck out on an absolutely original line with some small guns, making them by auto-frettage from centrifugal castings, and it is stated that favourable results have been achieved.

Normally it has been the practice, whether the body of a gun is monobloc or built up with two or more tubes, that the steel used should be forged. Ingots, appreciably larger in section than the diameter of the finished forging, are cast and discards cut from the top and bottom. They are then forged, either hollow or solid, to approximately the size required. Finally they are heat treated.

The United States have adopted a system of casting into a horizontal chill mould approximately of the dimension and shape of the exterior of the gun. The mould is rotated before the pouring of molten steel into it is commenced, and rotation is continued until the pouring is complete and the steel has solidified. During this time centrifugal force results in the heavier material tending towards the exterior, while the lighter constituents of the pouring, slag gas and non-metallic inclusions, segregate to the bore.

The casting is removed from the mould as soon as possible after solidification, and normalised before being allowed to cool down. A cut is taken off the exterior to about the same thickness as would be removed from the exterior of a forging, and the core is bored out. The casting is then auto-frettaged, or cold worked as they term it, by being permanently enlarged by internal pressure. It is understood that the amount of expansion is appreciably greater than that obtained with auto-frettaging forgings.

No information is available as to the results of mechanical tests of steel manufactured in this way, nor as to the strength of completed guns. It is understood, however, that several 3-inch and one or two larger guns have been made by this process, and that the factory officials believe that in due course it will be applicable to guns of all calibres up to 16-inch. It must be accepted that firing and other tests have shown that the guns have ample strength.

None of the British steel makers who supply gun steel have developed centrifugal casting for steel of this type, and it is unlikely that this method of manufacturing guns will be introduced for our Navy. It is understood that in the United States there is some

difficulty in obtaining high grade gun steel forgings except at great cost. It is possible that this may have led up to their investigating this alternative method of making guns.

Repair by Re-lining.

In the early days of breech-loading guns no major repair was possible. As soon as a gun became so worn as to shoot inaccurately, it had to be scrapped and replaced by a new gun. Yet the only portion that had deteriorated by fair wear and tear was the forging forming the bore of the gun, in those days termed the A tube. The body was still quite sound.

It was realised that if this tube could be replaced the gun would be repaired at a much lower cost than that of building a new gun. The existing designs of guns did not permit such replacement, but for new manufacture improved designs were introduced. In these there were two forgings running the whole length on which the rest of the gun was built. The inner of these, known as the inner A tube, or liner, was relatively thin. This inner A tube could be knocked out by blows from a heavy tup or machined out. It could then be replaced by a fresh forging. Alternatively, the A tube could be made additionally heavy, taking the place of both the ordinary A tube and the inner A tube in the normal design. When the gun became so worn as to be inaccurate the inner portion of this thick A tube could then be bored out so as to permit the introduction of a liner.

Until quite recently all guns except the smallest have been built to designs of this type, and repair has been carried out as indicated above. Such repair is an operation requiring particular skill. It has to be carried out at a properly equipped ordnance factory. It takes some months to complete. It is obvious that there would be great advantages if the replacement of the liner could be carried out quickly on board, or even if it could be handled at any naval ordnance depot.

In guns of pre-War and War construction the steel employed was of lower quality than that now available. In designs put forward by British armament firms the specifications for the strongest steels used called for a minimum yield point, under modern conditions of testing, of 27 tons per square inch. The maximum stress it was permitted to bear was 20 tons per square inch.

Guns are designed so that they can safely stand a pressure appreciably above that due to the propellant gases. For instance, a gun designed for a charge giving a normal maximum chamber pressure of 20 tons would be strong enough to stand a pressure of 30 tons. An internal pressure of 30 tons would result in the tension of the inner layer, due to this pressure alone, of some 35 tons, the exact figure depending on the ratio of external to internal diameter. To enable a liner to bear a powder tension of 35 tons per square inch without exceeding a total tension of 20 tons per square inch it is clear that it must have been in an initial compression of 15 tons per square inch.

It will be seen from the foregoing that with gun steels of pre-War

standard heavy compression of the inner A tube was necessary in the original construction of the gun. It will also be realised that, if the tube had been of steel strong enough to stand a tension of 35 tons, it would have been sufficient if it had been in intimate contact with the rest of the gun, without any initial compression. If it had greater strength still, there could safely be some small clearance between the tube and the body of the gun.

Loose Liners.

Of late years there has been a great development in the manufacture of large forgings of high-class alloy steel, and it is now possible to obtain gun forgings of this quality. The use of a liner not in contact with the body of the gun is therefore feasible. The use of such a liner enables the removal of a worn-out forging and its replacement by a new one to be carried out on board, in the case of small guns. With larger guns the operation could be carried out in naval armament depots.

Practically all nations have adopted or are experimenting with loose liners for small guns, and it is understood that in Italy experiments are being carried out with guns of medium and large calibre.

The first designs put forward were true loose liners, that is to say, they were thin forgings practically taking the place of the inner A tubes or liners of normal guns. They were made of exceptionally strong steel, yield points of over 60 tons per sq. in. being called for. In a later development guns have been built with two main forgings, a thick tube and a jacket, with a slight clearance between them. The jacket usually extends little more than half the length of the gun. This might well be described as a gun with a loose jacket to distinguish it from the type of gun with a thin loose liner.

Loose liners can, in nearly all cases, be inserted and withdrawn through the breech ring. They are entered from the rear and pushed home. They have the usual shoulder just in front of the chamber, and are inserted until this shoulder is in contact with that on the body of the gun. As they can pass through the breach ring it is necessary to have some fitting to prevent them moving to the rear. This usually takes the form of a bush, screwing into the gun body and having a shoulder butting on a corresponding shoulder on the liner. Most designs also have a bush at the muzzle end, this being intended to prevent the liner turning under the stress of rotating the shell when the gun is fired. This bush has longitudinal ribs on both interior and exterior, fitting into corresponding slots in both liner and gun. The liner is free to move forward through the muzzle bush, which thus offers no resistance to the liner lengthening slightly.

Replacing Liners.

To manufacture a gun and loose liner is no more trouble than to make a complete gun of a normal type, and it is also quite simple to make one or more spare liners for a given gun. The insertion

and removal of such liners are simple operations which could be handled in most ships without any outside assistance.

After the removal of the breech mechanism, the first operation is to unscrew the retaining bush. The liner is then free to move to the rear, but it will usually be found necessary to use some force to start it. A blow from a sledge hammer, or from a baulk of timber swung by half a dozen men, on a wooden plug inserted in the muzzle should be sufficient for this. Once started, the liner can be withdrawn straight to the rear through the breech bush.

Insertion of the new liner is not quite so simple an operation. Care has to be taken to avoid bumping the shoulder on the gun body as the liner is entered. Getting it in the right orientation so that the featherways are in line with the feathers on the muzzle bush, will also cause some trouble. Normally a liner can be pushed by hand to within a short distance from home, possibly a quarter of an inch. A few taps on the breech face, similar to those given to start it for withdrawal, will drive it home. Care is necessary in entering the retaining bush to ensure that it is square, as otherwise the threads may be damaged.

This type of liner has been adopted by the United States and Italy for several calibres of guns. It has been reported that they have no difficulty in changing liners. In practical trials liners have been shifted during target practice, and the interval between the last round from the original liner and the first round from the replace liner has been less than a quarter of an hour. It should rarely be necessary to change a liner as quickly as this, but this experience shows the facility with which the operation can be performed.

It has been reported from several sources that the accuracy of guns with loose liners is as good as that of normal built-up guns. No information is available as to the number of rounds which can be fired before the liner is worn sufficiently to effect accuracy, but there is no reason to suspect that their accuracy life is less than that of built-up guns.

It has been stated that it is easy to make a gun with loose liner. If, however, it is desired to make a number of such guns, and to have spare liners which can be inserted into any of the guns, the problem becomes more difficult. It is then necessary to work to very close limits as regards external diameters of the liners, internal diameters of the gun bodies, and the lengths of shoulders in each. Such close limits require particular care in manufacture, and with the increase in difficulty the cost also rises. It is difficult to ascertain how this question is being dealt with by different nations who are making guns of this type. Some are, no doubt, untroubled by it, but prefer to let each gun have its spare liner ready for insertion. Possibly this may become the general solution.

In the case of thin loose liners the question of transport of spare liners will require special consideration. It will be inadvisable to transport them unboxed as in the case of spare guns. They will not have the stiffness necessary to avoid risk of damage. A very slight deflection of a long thin forging may make it difficult or even impossible to insert it when required.

The alternative system of having a loose jacket over a thick tube is understood to have been adopted by at least one of the leading Continental nations. There is no reason to believe that such a gun will be less accurate than either a built-up gun or one with a loose thin liner. It could be made with a lighter chase than would be necessary in a loose liner gun. This enables the centre of gravity to be brought further back, which has some advantages from the point of view of the mounting. Medium and light guns can be made of two main forgings and a breech ring. The main forgings are of approximately equal weight, and the general design of gun is simple and satisfactory.

For the removal and replacement of a worn tube it is necessary in this case to unscrew the breech ring. In built-up guns it is customary to screw on the breech ring hot, so that when in place it shrinks on to the body of the gun, which it grips with considerable pressure. The removal of such a breech ring is an operation of some difficulty, and, in England, is carried out only at ordnance factories. Even when thus handled by experts damage is often done, necessitating in minor cases rectification of threads on gun, or breech ring, or both, and which sometimes entails supplying a new breech ring.

In order to be able to remove and replace the breech ring on board, its shrinkage on to the body of the gun must be abandoned and the gun must be made sufficiently strong not to require this slight assistance. Even when the ring is screwed on without shrinkage there is always the risk of some damage to the thread, which may prevent replacement until rectified. Dealing with this ring is probably the most delicate operation of re-lining.

The main disadvantage of the loose jacket design as compared with the loose liner type is the marked increase in weight of the spare forging. The ratio of weight is estimated to be about 3 to 1. Whether spare forgings are carried on board or retained in ordnance depots, the extra weight to be dealt with will always be troublesome.

Loose Liner Advantages.

Loose liners now being a practical proposition, the question arises as to what is gained by their use, and whether this gain justifies their adoption. No general reply can be given, for it will appear that in certain circumstances the gun with loose liner is the better proposition, whilst in others the built-up gun has the advantage.

Guns with loose liners will probably cost slightly more than built-up guns if each liner is made specially for one particular gun. If general interchangeability is needed the increase in cost will be appreciable, possibly 15 to 20 per cent.

If a ship with loose liner guns is sent to a foreign station it will be necessary to have available on the station one loose liner per gun if liners are special to individual guns, and one loose liner per four guns if liners are interchangeable. In each case at least one spare gun must also be available, ready to replace guns which may receive major damage necessitating more extensive repair than replacement of liner.

The cost of supply of the extra liners will go far towards neutralising the economy of making liners special for particular guns, and it is probable that common interchangeability will in time become the general requirement. For purposes of comparison with built-up guns we may accept, therefore, that the loose liner guns will cost 15 to 20 per cent. more.

To justify this extra cost there must be compensating advantage due to the easy repair. If ships are operating in home waters within easy reach of naval armament depots, where spare guns can be kept, and with ordnance factories, where re-lining can be carried out, not far away, it may well be better to retain built-up guns. But for ships on foreign stations the advantage of easy replacement of damaged liners on board may be found to justify the adoption of loose liner guns.

High Velocity Guns.

There is, however, another consideration which will have a considerable bearing on the question of adoption of loose liner guns. This is the possibility of utilising a much higher muzzle velocity than has previously been called for. Increase in muzzle velocity entails reduction in accuracy life, i.e. reduction in the number of rounds which can be fired before the gun is so worn as to become inaccurate. At present it is essential that all guns shall have a good accuracy life. If re-lining can be made a simple operation this is no longer of such importance. Where high muzzle velocity is of great value it can be called for, and the resulting short life of individual tubes can be accepted.

The possibility of obtaining higher muzzle velocity from anti-aircraft guns opens up probabilities of improvement in attack of planes. In the first place, fire can be opened at ranges at which the lower velocity gun would not be able to reach the height at which the aircraft may be flying. Secondly, as the shell will take a shorter time to reach the spot where it is anticipated the target will be, the allowance to be made for its movement during that time will be less, and the errors in the prediction of its movement will also be reduced.

It is understood that at least one Continental armament firm is prepared to supply anti-aircraft guns with a muzzle velocity of 1,000 metres per sec., roughly 3,300 f.s. This is a big increase on the 3,000 f.s. which is the maximum velocity previously utilised, whilst most existing anti-aircraft guns have far lower velocities, coming down to the 2,000 f.s. of our 3-inch gun which we employed in the late war.

There has been little experience on which to base conclusions as to the effect on accuracy life of such high velocity, and no information is available about these actual guns. It is estimated, though, that they will be worn out with about one-fifth of the number of rounds which could be fired from the same gun if the velocity had been kept down to 3,000 f.s. Such a loss of accuracy life is a big price to pay for an increase of 10 per cent. in muzzle velocity. If a gun had to go back to an ordnance factory for repair when worn out it is clear that the high velocity and short life would not be a practical pro-

[Photo by Frank and Sons, South Shields.

H.M. SLOOP SCARBOROUGH, 1,040 TONS.

Commissioned at Chatham, October 21, 1930.

(By courtesy of the builders, Swan, Hunter & Wigham Richardson.)

position. The use of a loose liner with replacement of the liner on board changes the situation entirely. If repair can be carried out in less than half an hour, and the gun available for further firing practically in the same condition as new, why not have the highest velocity attainable and accept the rapid wear of tubes? This is a question which is being considered by many nations.

The accuracy of a high velocity gun is generally not as good as that of a low velocity gun. Also, it suffers from a greater loss of velocity per round, and therefore it is more difficult to estimate its actual velocity at any given stage of life. Modern control of anti-aircraft firing is based on the muzzle velocity of each gun being known and the sights adjusted accordingly. Errors in the estimates of the velocities of individual guns forming a section under one control will result in additional dispersion of the shell bursts from that group. The accuracy of a section of high velocity guns therefore compares unfavourably with that of a section of low velocity guns, due to both the relative inaccuracy of the individual guns and the poorer estimate of their muzzle velocities. This is a point which has to be borne in mind when considering whether to adopt high velocity guns, and which may outweigh the advantages of the latter as just stated.

The following table gives some idea of the gain in anti-aircraft attack with increase of velocity. The figures are of comparative value only. In calculating them it has been necessary to assume arbitrarily a standard weight and a standard form of shell, for the purpose of ascertaining air resistance. Actually these vary appreciably for guns of the same calibre by different designers. Also, when dealing with the design of a new gun with which it is desired to obtain high muzzle velocity, it is often the practice to utilise a lighter shell than would be employed if a lower muzzle velocity were to be accepted. This difference in weight would change the effect of air resistance. It has been impossible to allow for these variations in the form of a simple table.

	Time to height of 20,000 feet at ranges of :		
M. V.	1,000 yards.	5,000 yards.	10,000 yards.
F.S.	Secs.	Secs.	Secs.
3,300	9·6	14·0	24·7
3,000	11·3	16·0	29·8
2,700	13·0	18·2	35·9
2,400	15·2	21·3	*
2,000	19·1	28·0	*

Danger of Rust.

With both loose liner and loose jacket guns there is a definite, though small, gap between forgings open to outside air. Although access of water or of damp air will be checked by the oiling or greasing

* At the range concerned the height of 20,000 ft. cannot be attained.

of the surfaces of the forgings, the possibility of accumulation of moisture in this gap must be accepted, and rusting will follow. If this rust be not dealt with in its early stages it may be found that the difficulty of removing a worn-out forging is considerably increased, and it may be impossible to carry out the operation on board.

To obviate this it will be necessary occasionally to remove the liner or barrel and to clean up any parts touched by rust. It is anticipated that where guns of either of these types are supplied the withdrawal and replacement will be carried out by the ship's staff as a normal periodic overhaul, at least once a quarter, and possibly once a month.

Future Development.

Prophecy as to future development, even in the near future, is invariably difficult. Something unforeseen may arise to change the whole trend of development. For guns to be built in, say, 1936 there is, however, a great possibility that all guns for anti-aircraft defence, and possibly all guns of 6-inch calibre and below, will be of the type described here as loose jacket guns. It is considered probable that anti-aircraft guns will usually be designed for a muzzle velocity approximating to, but not exceeding, 3,000 f.s.

Artillerist.

CHAPTER VII.

THE IMPORTANCE OF NAVAL RESERVES.

THE War of 1914–18 established beyond dispute the essential truth of the first Earl Brassey's dictum, nearly half a century ago, that :—

> "Of all problems in naval administration, the formation of reserves of seamen is the most important."

In earlier conflicts, reserves, as we now know them, simply did not exist. To fill up vacancies, when volunteers were scarce, recourse was had to that unsatisfactory and unpopular device, the press gang. Its harvest ashore was usually a poor one, comprising a minority of genuine seafaring men, and a large proportion of "waisters"—men unfit to be trusted aloft or at the wheel. It is true that when applied to the mercantile marine, the press yielded a fair supply of the prime seamen of which there was such need. It is a well-founded tradition that Howe's victory on the Glorious First of June, 1794, was gained with crews recruited from this source. But upon the unfortunate merchantman the effect was apt to be disastrous, when her crew was left too weak to save the ship in emergency, or to withstand the attack of pirate or privateer. A third source of supply was the pressing of smugglers, good enough seamen, but unreliable from a disciplinary point of view.

THE PRESS GANG'S DEFECTS.

Under such a system desertions were frequent, and mutiny an ever-present danger. Nelson calculated that the average cost of a pressed man to his country was £20. Yet in the nine years of naval war from 1793 to 1802, desertions are reckoned to have totalled 42,000; while at a later period (1811–1813), 27,300 are said to have "run" in three years against a total of 29,405 pressed. To quote Admiral Lord Clarence Paget on the subject—

> "The total gain to the country during those three years by impressment was 2,105 men. But in order to bring those men thus compulsorily into the service, 3,000 good sailors had been employed ashore as press gangs. Therefore the country actually lost about 1,000 men during those three years."

That a system so appallingly wasteful should have endured from the Royal Navy's early days until its abolition in 1833, is an astonishing fact on which historians have seldom been inclined to dwell.

THE MANNING PROBLEM IN 1854.

It was the Russian War of 1854–56 which pointed to the urgent need for some permanent naval reserve. In 1847 a bill had been

passed providing, in the event of war, for the issue of a proclamation offering bounty to all seamen volunteering for service in the fleet. Unfortunately, this bill was so badly drafted that, in the opinion of the law officers of the Crown, the men already serving would have been able to take advantage of it to claim the bounty. To avoid the risk of incurring such additional expenditure, estimated at half a million sterling, it was decided by the Cabinet of the day that to issue the proclamation as prescribed by Act was, in the words of the First Lord, Sir James Graham, "impolitic and unnecessary."

Against this short-sighted decision, Admiral Sir Charles Napier, the newly designated Commander-in-Chief of the fleet formed to operate in the Baltic, protested with all his might. His annoyance at the Government's failure to employ the only effective means at their command for manning his ships was all the greater, since, in 1847, from his seat in Parliament, he had striven in vain to remedy the very defect in the Act which had caused it to remain a dead letter. In return for his expostulations he received a broad hint that, if he were not satisfied, he need not accept the command. In view of what followed, he would have been wise to have taken the First Lord at his word, having regard to Napier's own published views against the employment of elderly flag officers (he was within a month of his sixty-eighth birthday). But being of the old-fashioned opinion that a naval officer should never refuse any employment offered to him, he made the best of a bad job.

What followed is a matter of history. Men of all descriptions were entered to make up the fleet's complement. To quote the chronicler of the Baltic campaign—

> "Any one who presented himself had to be accepted. No provision was made to clothe them in the manner which the climate required, and such as could afford it had afterwards to clothe themselves or go without."

But for a leavening of old seamen recruited from the dockyard riggers and the coastguard, and 400 volunteers from the merchant service, matters would have been still worse. So badly manned a fleet could hardly have been expected to accomplish as much as it did. Yet its failure to do all that the public had been led, by an ill-informed press, to anticipate was visited upon the head of the luckless Commander-in-Chief, instead of on those of the parsimonious politicians whom his complaints had failed to move. He may be adjudged to have deserved well of his country in refusing to risk ships in an enterprise so hazardous as a bombardment of Kronstadt would have been.

A Royal Commission's Proposals.

But the lesson was not to be wholly lost. In 1859 a Royal Commission, presided over by Lord Cardwell, made a number of important recommendations concerning the future manning of the Navy. Impressment being unanimously condemned, it was proposed that reserves to the total strength of 60,000 should be constituted. Of these, 8,000 were to be pensioners, of ten years' naval

service, a proposal in which can be perceived the germ of the future Fleet Reserve. Admiral Sir Charles Napier, as the original sponsor of this method of forming a reserve, may be regarded as the father of the R.F.R. scheme of forty years later. Twelve thousand men were to be provided by the coastguard, and 10,000 by the Royal Naval Coast Volunteers, a force authorised by an Act of 1853, and composed mainly of fishermen and longshoremen. It never fulfilled expectations, and was abolished twenty years later. Reliefs at the home ports were to be maintained at a strength of 4,000, and Royal Marines embodied in shore establishments at 6,000. For the remaining 20,000 men, reliance was to be placed on merchant service volunteers.

The Royal Naval Reserve.

This last most important organisation was duly provided for by the Naval Reserve Act of 1859, the force which it created becoming known in due course as the Royal Naval Reserve. Its greatest worth has always been that its members are professional seamen. To begin with, there was no provision for the entry of R.N.R. officers, but this was remedied in 1861, by which time the number of ratings had reached the respectable figure of 5,000. By 1870 the total had swelled to 16,000, whose annual cost, according to the Navy Estimates, was under £250,000.

From that day to this, though official discouragement and antiquated methods of training had to be overcome, the Royal Naval Reserve has never ceased to develop in value and efficiency. A notable improvement was the introduction, in 1872, of the rank of Midshipman, R.N.R., by which naval training was made available to officers at an earlier age than formerly. At the same time it was announced that each year the Admiralty would select a certain number of cadets from the mercantile marine training ships Conway and Worcester for the new rank, thus making it a coveted distinction to the budding merchant service officer.

In 1873 Earl Brassey (then Mr. Thomas Brassey, M.P.), who always displayed the keenest interest in the R.N.R., urged that facilities be given for officers to take gunnery courses in H.M.S. Excellent; that modern guns and equipment be furnished for training the personnel; and that the allowance for trained men be increased. Ultimately all these desirable reforms were carried into effect, though the only immediate official response was an extension of drill facilities. At the beginning of 1875 the task of superintending Naval Reserves generally, which had hitherto been borne by a Commodore, was confided to an officer of flag rank.

In the Arctic Expedition of 1875–76, under Sir George Nares, the Royal Naval Reserve played a useful part, some ratings with experience of whaling and sealing in the Far North being included in the personnel. A large proportion of the reservists enrolled in Scotland were men of this type, and with the abolition of the Coast Volunteers, a great many fishermen joined. From time to time doubts were expressed as to the value in war of these men, who,

owing to their inability readily to assimilate the details of naval routine, were apt to be regarded as a nuisance afloat; but the immense growth of auxiliary services during the War provided unlimited scope for men of this kind, whose knowledge of the intricate waterways around the British coasts proved indispensable.

War Scares and their Effect.

By 1880 the personnel of the R.N.R. included 17,500 ratings. The recurring war scares of the ensuing decade caused increased attention to be given to their training. In 1885 the threat of hostilities with Russia caused a number of merchant vessels to be taken up as armed cruisers. Of these, the fastest was the Cunarder Oregon, holder of the Atlantic blue riband, which was allowed to participate in the manœuvres of 1885, under Admiral Sir Geoffrey Hornby. While most of her original officers were retained, she was manned by naval personnel, except for the stokehold complement. Of the other merchant ships commissioned, the majority were used as transports, though arrangements were approved for a proportion of R.N.R. ratings to be drafted to each. A scheme was prepared by which R.N.R. seamen, in the proportion of one-third of the complement belonging to that branch, were to have formed part of the crews of H.M. ships brought forward for commissioning in the event of war.

As an outcome of this expensive experiment, certain fast merchant steamers were subsidised for use as armed cruisers in war time, on condition that they were partly manned by men of the Royal Naval Reserve. Several R.N.R. officers were permitted to serve in H.M. ships during the 1885 manœuvres, an innovation repeated in 1886. This was followed by new regulations which made twelve months' sea training a principal condition for the award of retaining fees to executive officers of the R.N.R. As a means of increasing the efficiency of the force this measure was of the first importance. Not only did it give R.N.R. officers practical acquaintance with naval routine and the internal economy of a warship, but it made officers of the Royal Navy and the Royal Naval Reserve acquainted with each other's ideas and experience, to the prevention of future misunderstandings. It was further arranged that all R.N.R. sub-lieutenants above a certain age should be granted the acting rank of lieutenant while under training afloat, so that they might mess in the wardroom instead of the gunroom. On the satisfactory completion of twelve months' training they were confirmed in the rank of lieutenant.

With the Naval Defence Act of 1889 came the realisation that the number of R.N.R. officers on the active list—under 400—was insufficient for future requirements. In the following year provision was made for them to take short gunnery courses, a very desirable facility which had been suggested by Lord Brassey seventeen years before. Increases in the established numbers of officers followed.

In 1891 R.N.R. seamen were asked to volunteer for duty in H.M. ships during the manœuvres; so gratifying was the response that

the numbers embarked had to be restricted before they reached 500. In 1894 a still larger contingent was taken to sea, 700 being allowed to do six months' training afloat. Stokers were first embarked for a cruise in 1897.

The Royal Fleet Reserve.

An important step taken at the beginning of 1901 was the establishment of the Royal Fleet Reserve of men, who, after service afloat in the Royal Navy, accepted engagements in this Reserve under certain conditions regarding training. It was formed under the Naval Reserve Act of 1900, and consisted of two classes, "A," composed of life pensioners only; and "B," composed of certain ex-naval ratings and marines, who, having taken their discharge from active service without life pensions, volunteered to join within five years of their discharge, as well as of special service men who had agreed to be transferred to the Reserve at the expiration of their short service engagement. A further class, numbering 5,000 men, known as the Immediate Reserve, with more liberal retainers, was formed on May 1, 1912, to provide for the more expeditious manning of ships of the Third Fleet in case of emergency. It was abolished after the War. In October, 1931, the Admiralty decided that class "A" of the Royal Fleet Reserve should be allowed to die out, no further enrolments being made in it. The strength of class "A" in the 1931 Estimates was 5,762, as compared with 14,925 in class "B." With a reduced active list personnel, it naturally follows that the strength of the Royal Fleet Reserve must decline in proportion, and with all entry into class "A" stopped, the flow into the Reserve will be less than for many years. Hence the importance of encouraging the R.N.R. and R.N.V.R.

The Grey Committee.

In 1902 a committee was appointed under Sir Edward (later Viscount) Grey, to inquire into the adequacy of the existing Naval Reserves. It reported that to supplement an active service personnel of 122,500 (Royal Navy and Royal Marines), there were 24,300 R.N.R. ratings, 2,650 Royal Fleet Reserve, 4,200 coastguard, and 12,500 pensioners. Amongst the recommendations put forward were a further increase in the establishment of R.N.R. officers and the addition of the rank of commander. Accelerated promotion and better training facilities were also urged. All these proposals were gradually carried into effect, and in 1905 an entirely fresh system of training was inaugurated. Most of the harbour drill ships and batteries which had hitherto played the leading part in the instructional programme were suppressed. In their stead, H.M. ships in reserve commission were ordered to be used for giving three months' training courses to R.N.R. personnel. Many modifications in the classification of ratings were introduced, with the object of weeding out a certain number not completely qualified for the rates which they held. By the beginning of 1910, when these changes had had

their full effect, the total strength of the R.N.R. was a little under 21,000.

In 1910 the Trawler Section of the Royal Naval Reserve was constituted, its members being given special instruction in mine-sweeping. The warrant rank of Skipper was conferred on the masters of trawlers engaged for these duties.

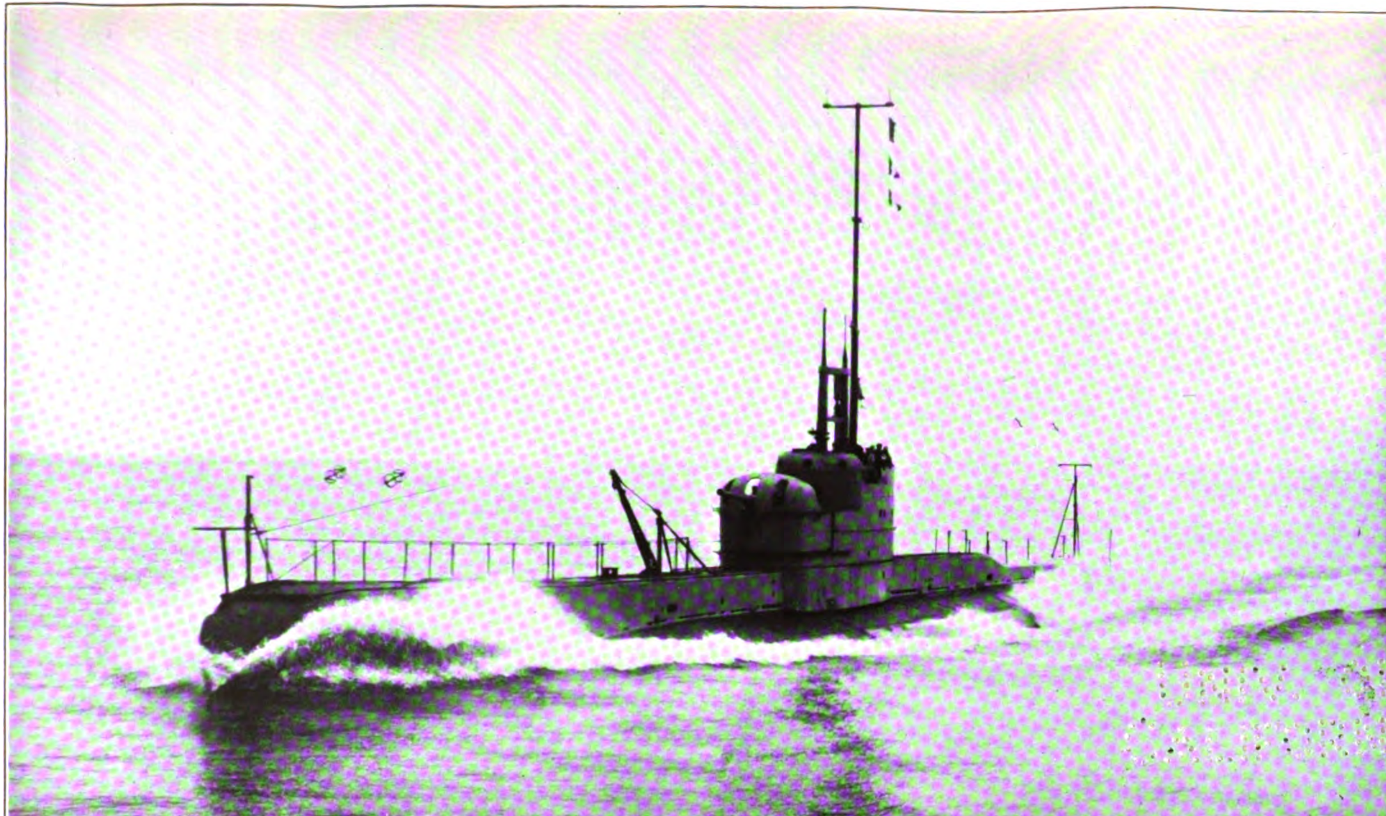
Six weeks before the outbreak of war the new rank of Captain, R.N.R. was created and bestowed on four commanders of long and meritorious service.

At the beginning of August, 1914, the strength of the Royal Naval Reserve stood at 18,025 officers and men. Of these, 16,640 appear to have been mobilised the same month, according to figures given in the appendix to the Official History of the Naval Operations of the War.

The Royal Naval Artillery Volunteers.

In 1872, largely through the exertions of the founder of this Annual, the formation of a new reserve, known as the Royal Naval Artillery Volunteers, was approved by the Admiralty. In London the nucleus was composed of yachtsmen and members of the various Thames rowing clubs, but men of nautical proclivities in every walk of life ashore were eligible as recruits. They were required to render themselves proficient in gunnery and the use of small arms. For this purpose H.M.S. Rainbow—later replaced by H.M.S. Frolic—was moored in the Thames off Somerset House as a floating head-quarters, a small instructional staff being maintained on board. Similar facilities in the shape of drill vessels or batteries were afforded to members of the R.N.A.V. at Liverpool, Glasgow and other ports, but their opportunities for training afloat were few and far between. Boat sailing and pulling on rivers and estuaries had to serve as a substitute for naval experience at sea.

Though its numbers were comparatively insignificant, this force was undoubtedly valuable as a link between the Navy and the civil population. Unluckily, its life was not long. In 1892, when its strength stood at a little under 2,000, it was disbanded on the recommendation of a committee presided over by Sir George Tryon, who had previously held the post of Admiral Superintendent of Naval Reserves. Ostensible reasons for this condemnation of the R.N.A.V. were that its training was too little concerned with the sea, being mainly confined to gun drill in hulks and batteries. Yet in 1889 strong representations from commanding officers as to the desirability of giving the Volunteers more sea training had been turned down on the score of the expense that would be involved. There is no doubt that the real reason for the force's abolition was not any question of its efficiency, but a false idea of economy. It is noteworthy that Sir Allen Young, the only member of the committee with intimate knowledge of the work of the R.N.A.V., declined to sign the report.



H.M. SUBMARINE ROVER 1,475 TONS.

Commissioned, December 13, 1930.

(By courtesy of the builders, Vickers-Armstrongs, Ltd.)

The Royal Naval Volunteer Reserve.

Eleven years later, under the régime of Sir John Fisher as Second Sea Lord, the idea which had been first embodied in the R.N.A.V. was revived by the formation of the Royal Naval Volunteer Reserve. This new force was permitted to receive instruction in many branches of the naval technique which had been denied to its predecessor, with opportunities of going to sea annually in H.M. ships. More instructors were allowed, and R.N.V.R. gunnery, torpedo and signal courses were opened at the training establishments with gratifying results, it being found that the average volunteer absorbed such instruction with remarkable rapidity. Commanding officers of divisions were given the rank of Commander, whereas Lieutenant had been the highest attainable in the R.N.A.V. Sundry other improvements were incorporated in the regulations from time to time, with the object of affiliating the organisation more closely to that of the Royal Navy.

H.M.S. President (ex-Buzzard) was stationed near Blackfriars as the drill-ship of the London Division of the R.N.V.R., which was also given a shore headquarters on the Surrey side opposite—since abolished on grounds of economy. Other divisions on the Clyde, Mersey, Tyne, Severn and Sussex coast were given either drill-ships or shore establishments of a similar character. In the ten years preceding the Great War the R.N.V.R. was brought to a level of efficiency far higher than had been touched by the R.N.A.V. Doubtless improved methods of training had much to do with this, but knowledge of the growing tension of Anglo-German relations provided an additional incentive to the personnel to render themselves thoroughly efficient. So keen a spirit deserved a better reward than it received in August, 1914, at which date the R.N.V.R. mustered 4,198 officers and men.

Good Material Wasted.

A year or more before hostilities began, the most definite assurances were given by the Admiralty to the R.N.V.R. that, immediately on mobilisation, there would be a place in the fleet for every man. Yet when the day arrived, fresh counsels of dubious value prevailed. Gunnery, torpedo, signal and navigation schools were swept bare of officers and men in order that they might man newly commissioned ships. As the War went on, the dislocation of naval training caused by this unwise step had to be slowly and painfully overcome, and the schools re-staffed. But the first effects were most unfortunate for many reservists, the R.N.V.R. in particular. With the exception of a fortunate few, mostly signal ratings, hardly any naval volunteers were drafted afloat in the early days of hostilities, their places having been filled by personnel from the training establishments. Even those volunteers who happened to be undergoing sea training at the end of July, 1914, were landed in pursuance of this mistaken policy. Including these men, there remained ashore some 3,500 or more of the R.N.V.R., who were

hastily brigaded with a similar number of temporarily redundant Royal Marines, Royal Fleet Reserve and Royal Naval Reserve ratings, to form the famous Royal Naval Division.

To convert into infantry men whose whole training had been modelled on that of the senior service was sheer waste of good material, irrespective of its discouraging effect on the eager spirits made to suffer such an abrupt transformation. A corps less loyal to naval traditions might not have stopped short of mutiny. In the London Division, the resentment aroused found vent in the solemnity with which all hands attended the ceremony of burying a marlinspike and a copy of the Seamanship Manual.

Though a certain number of these involuntary soldiers succeeded in getting to sea before the end of the War, over 2,000 were taken prisoners or interned in Holland after the fall of Antwerp, while many more fell in Gallipoli and France. Despite its heavy losses, the Royal Naval Division contrived in the face of endless obstacles to preserve something of its naval character, while as shock troops it earned a reputation for hard fighting which was second to none.

It has often been suggested that no other troops could be spared for the Antwerp Expedition. This is to ignore the presence in England at that time of many regiments of Territorials, in the aggregate far more numerous. By virtue of their longer training as infantry they were far better fitted for such service than naval reservists.

Services of Reserves in the War.

One of the first demands made on the Reserves in 1914 was for additional officers in quantities exceeding the established totals available. Temporary lists were soon opened in both R.N.R. and R.N.V.R., the names on which by the date of the Armistice were much more numerous than those of permanent officers. At the same time, thousands of R.N.R. and R.N.V.R. ratings were enrolled for service during the period of hostilities. By November 11, 1918, the total number of reservists serving, exclusive of the Royal Naval Division, stood at the following round figures, taken from the Official History of the Naval Operations of the War :—

Royal Fleet Reserve	19,000
Royal Naval Reserve	67,000
Royal Naval Volunteer Reserve	38,000
Colonial Reserves	2,000

making a grand total of 126,000, as compared with under 50,000 at the beginning of the conflict.

It is hardly necessary to detail the magnificent services rendered by these Reserve formations during the War. In the Tenth Cruiser Squadron, which for so long guarded the Northern Approaches, the bulk of the personnel was drawn from the R.N.R. In his reminiscences, Admiral Sir Reginald Tupper has expressed his appreciation of the unfailing readiness with which the most onerous duties were carried out, in the worst of weather, in this hard-worked squadron.

Such celebrated actions as that between the Carmania and the Cap Trafalgar, between the Alcantara and the Greif, and between the Dundee and the Leopard, were predominantly R.N.R. affairs. Reservists of all categories furnished the complements of most "Q" ships, notably the Dunraven, Pargust, Baralong and Stock Force. Invaluable service was performed by senior officers of the R.N.R. during the later stages of the War as Commodores in charge of convoys.

Services which were manned practically throughout by the R.N.R. and the R.N.V.R. included the mine-sweeping flotillas, the auxiliary patrol, the boarding steamers, and the salvage section; the extent of these ancillary services by the end of the War exceeded the expectations of the most far-seeing. As events proved their capacity, R.N.R. and R.N.V.R. officers were in due course appointed to the command of destroyers, submarines, mine-sweepers and patrol vessels of every description. Commissions in the Royal Navy were bestowed on selected officers of the R.N.R. as a reward for distinguished service. These commissions were not on the supplementary list, and therefore carried the same prospects as those obtained by direct entry.

Progress since the War.

In 1921 fresh regulations were issued for both the Royal Naval Reserve and the Royal Naval Volunteer Reserve, embodying much of the experience gained in the War. Details will be found in Brassey's "Annual," 1921–2, p. 25. In both forces provision was made for officers to specialise to an extent which had not before been possible. To-day reserve officers can qualify in navigation, gunnery, torpedo, signals, mine-sweeping, etc., and are distinguished accordingly by various initials against their names in the lists. Promotion is now more than ever dependent upon training being undertaken with a fair amount of regularity. Opportunities for the sea training of officers and ratings have been increased, and conditions of enrolment simplified.

During the year 1931, up to September 30, returns show that reservists were embarked for sea training as follows:—

	Officers.	Ratings.
Royal Naval Reserve	689	2,496
Royal Naval Volunteer Reserve	332	2,526

In the case of the R.N.R., the above figures certainly constitute a record. This is to be attributed to the unprecedented shipping slump, which has had the effect of inducing unemployed officers and men of the merchant service belonging to the R.N.R. to apply for permission to undergo sea training. But even in normal years, the number of R.N.R. and R.N.V.R. officers and men under training in H.M. ships has much increased since the War. To-day it is a rarity to enter a wardroom in a big ship and find no reserve officers in the mess, thus promoting closer relations with the regular service. With the recent creation of the rank of probationary acting

sub-lieutenant, R.N.R., no officer of the Merchant Navy is debarred from joining the Reserve.

The following are the latest figures available concerning the strength of the various reserves (officers and men) :—

Royal Fleet Reserve	20,687
Royal Naval Reserve	9,097
Royal Naval Volunteer Reserve	4,726

giving a total of 34,510, or rather more than one-third of the numbers voted for the Royal Navy and Royal Marines during the current year. In view of the steady and alarming reductions made in the personnel of the Royal Navy in the last few years, it becomes a question for earnest consideration whether an increase should not be made in its reserves. At the present time, drafting commanders have a hard task to find enough ratings to man newly commissioned ships at the home ports. War would place a terrific strain upon the resources of the Manning Department. Not all of the 34,510 reserve officers and men would be available at once, since normally much of the R.N.R. is scattered over the seas in merchant ships. Presumably, the official view is that the auxiliary services might be manned by temporary entries, as in 1914–1918, but unless preliminary training can be provided, much time and money would be wasted in utilising inexperienced personnel for these duties.

Unquestionably there is a strong argument here for the expansion of the Royal Naval Reserve to at least double its present strength. Neither should there be difficulty in extending the scope of the R.N.V.R. Existing divisions of this force comprise London, Sussex, Severn, Mersey, Ulster, Clyde, East Scottish and Tyne. Large areas, in which there must undoubtedly exist many desirable recruits, are at present untapped owing to their distance from the nearest R.N.V.R. headquarters.

Economy might be achieved by somewhat closer liaison between the R.N.R. and R.N.V.R. organisations. It has been suggested to the writer that, without going to any great expense, it should be possible to extend existing R.N.V.R. headquarters so as to provide extra accommodation for R.N.R. training. Arrangements would need to be made to avoid any clashing between the requirements of the two forces, but otherwise there seems nothing impracticable in the idea. The provision of such additional facilities would stimulate recruiting for the Royal Naval Reserve; while a further purpose would be served in a big port such as Southampton, where the provision of a drill establishment would enable a new division of the R.N.V.R. to be raised in a district which has hitherto been neglected.

Whatever the means adopted, a strong case undoubtedly exists for the expansion of the existing Naval Reserves to a point which would compensate to an appreciable extent for the steadily waning strength of the active service personnel of the Royal Navy.

FRANCIS E. McMURTRIE.

CHAPTER VIII.

The Foreign Fleet Air Arms.

UNITED STATES.

THOUGH the United States was the first country in the world to land an aircraft on the deck of a ship, which was carried out in the U.S.S. Birmingham, in November, 1910, no great interest was displayed in her Aerial Navy till after the War, and not, in fact, till the first carrier took the sea in 1921, nearly four years after the completion of the Argus, the first British carrier on which an aircraft could land.

The United States Naval Air Service has now become by far the largest in the world, with a flying personnel twice as numerous as the next largest—that of Japan—and it is a branch of the Naval Organisation. It is controlled by the Assistant Secretary of the Navy for Air—Hon. David S. Ingalls—under the Secretary of the Navy. Rear-Admiral W. A. Moffett holds the post of Chief of the Bureau of Aeronautics (1931).

Organisation.

The squadron is the tactical and administrative unit of the Naval Air Service, and it is usually composed of eighteen aircraft in two divisions of nine. The Squadrons embarked are allotted as follows :—

Battle Force.
- U.S.S. Saratoga : No. 1 Fighter ; No. 2 Scouting ; No. 2 Bomber, and No. 2 Light Bomber.
- U.S.S. Lexington : No. 3 Fighter ; No. 3 Scouting ; No. 1 Light Bomber, and No. 1 Torpedo Bomber.
- U.S.S. Langley : No. 2 Fighter ; No. 2 Scouting.
- U.S.S. New York : No. 3 Observation.
- U.S.S. New Mexico : No. 4 Observation.
- U.S.S. West Virginia : No. 5 Observation.
- U.S.S. Omaha : No. 4 Scouting.
- U.S.S. Aroostook : No. 1 Utility.

Scouting Force.
- U.S.S. Wright : No. 9 Torpedo Bombing ; No. 2 Utility.
- U.S.S. Richmond : No. 5 Scouting.
- U.S.S. Arkansas : No. 2 Observation.

Asiatic Fleet.
- U.S.S. Jason : No. 5 Torpedo Bombing ; No. 8 Scouting.

The remaining squadrons are located at the Fleet bases, and it is understood that eventually, for every squadron embarked, there will be a corresponding squadron ashore. These squadrons will interchange personnel, and so provide opportunity for the all-important flying training ashore.

Personnel.

A great effort has been made to make service in the Naval Air Force attractive, and so successful has this been that many young naval officers count it a bad day if for medical or other reasons they are unable to serve in the air. If they are selected, they are tried out at Hampton Roads, and should they show promise of making good pilots they are sent for training to Pensacola. The pilots receive the pay of their naval rank, and in addition 50 per cent. of this sum as flying pay. They wear the uniform of their naval rank with the addition of "wings." Nearly all the pilots, both officers and N.C.Os., are volunteers from the Fleet, but there is also a small direct entry. The pilots are trained to be observers as well, and so a second pilot does duty as an observer. In the U.S. Naval Air Service they rely mainly on D/F for their position, and make little attempt at navigation.

In 1931 there were 634 officer pilots and 266 N.C.O. pilots, though it is understood that the authorities aim to have 2,000 pilots in the Naval Air Service, in which case the air expenditure in the last Naval Appropriation Act, $35,000,000, will have to be increased considerably.

The United States Marine Corps of Aviation exists to furnish the Air Forces necessary for Marine expeditionary duty, Marine advanced base operations, and the defence of naval bases outside the Continental United States which are defended on shore by Marines.

Carriers and Tenders.

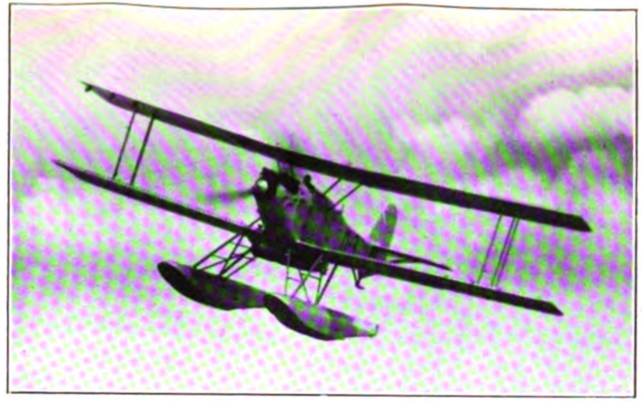
The Carrier tonnage allowed by the Washington Conference is 135,000 tons. At the present time (1931) the United States have only 76,286 tons completed, leaving a large margin for construction. The Carrier Squadron consists of the Langley, launched in 1921; the Lexington, 1927, and the Saratoga, 1928. The Ranger, of 13,800 tons, is under construction. The Langley was originally the collier Jupiter. She was converted on somewhat the same lines as H.M.S. Argus, and is of 10,286 tons, speed 15 knots. She was the first big ship to be fitted with "electric drive" main engines. This was an attempt to get the machinery and boilers to stand up to the very great strains which are imposed upon the propelling plant of a carrier by the sudden fluctuations of speed required for working aircraft. She is reported to carry 50 aircraft, but 30 is probably the number which can be worked efficiently. She is also fitted with launching catapults, and a Sperry gyro stabiliser.

The Saratoga, Flagship of the Carrier Squadron (Rear Admiral Yarnell), and the Lexington are of 33,000 tons. They have G.E. turbines and electric drive giving a speed of 33 knots. They cost $45,000,000 each. These ships are identical from the flying point of view, as both are of the superstructure type, and the hangars are arranged one above the other. It is reported that they can accommodate 120 aircraft, but again, somewhere between 70 and 80 is more like the number which can be handled. The Ranger is

THE "SOUTHAMPTON" MARK X. FLYING BOAT.

(Three Bristol "Jupiter" Engines.)

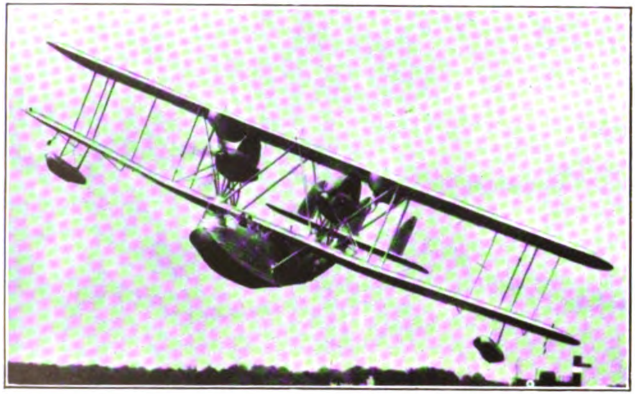
Supermarine Aviation Works (Vickers) Ltd.



THE "VILDEBEEST" TORPEDO BOMBER.

(Twin-Engined Float Seaplane.)

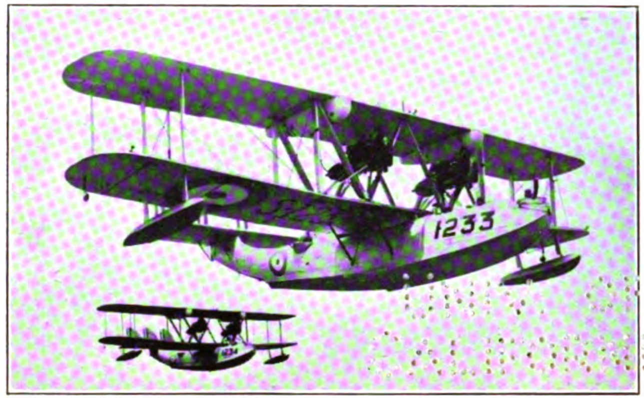
Vickers (Aviation) Ltd.



THE "SOUTHAMPTON" FLYING BOAT.

(Two Rolls-Royce "Kestrel" Engines.)

Supermarine Aviation Works (Vickers) Ltd.



THE "SOUTHAMPTON" FLYING BOAT.

(Two Napier "Lion" Engines.)

Supermarine Aviation Works (Vickers) Ltd.

building at Newport News, Virginia, the contract having been awarded on October 16, 1930. She will be of 13,800 tons, have accommodation for 76 aircraft, and is to be completed early in 1934.

The United States have probably gone further than any other country in solving the deck landing problems, and this they have achieved mainly by improved arresting gear and controlled deck landings. The arresting gear usually consists of a hook on the aircraft engaging in a transverse wire stretched across the flying deck, so that as the aircraft moves forward, the rate of speed of veering either end of this wire can be controlled frictionally or magnetically. In controlled deck landings the pilot of the aircraft does not use his own judgment when landing on the deck. He watches the signals of the controlling officer, an officer of great deck-landing experience, who tells the pilot " too high," " too low," " too fast," " too slow," and " cut gun " (shut off engine and land). In this way only about one quarter of the landing deck of the Lexington and Saratoga is used, the rest of the deck being available for " parking " aircraft, thereby doing away with the necessity for clearing the deck before each aircraft lands.

The United States has the following aircraft tenders: U.S.S. Wright (Tender Flagship), which has repair and erecting shops for seaplanes ; U.S.S. Aroostook, U.S.S. Gannet, U.S.S. Pelican, U.S.S. Teal, U.S.S. Sandpiper, and U.S.S. Jason.

Other Ships Carrying Aircraft.

All battleships carry three observation aircraft, and all cruisers carry two scouting aircraft. Catapults are in general use throughout the Navy, and they are either of the compressed air or impulse types. Usually an aircraft, when catapulted, is given flying speed in about 60 feet.

JAPAN.

Japanese interest in their Naval Air Service dates from 1912, from which date pilots were trained in France and the United States. Little progress was made, however, till 1921, when a " non-service " British Mission, under Col. The Master of Sempill, assisted with the reorganisation of the Japanese Naval Air Service, and the first Japanese carrier, the Hosho, was launched.

Organisation.

In Japan, the Military and Naval Air Forces come under the War Office and Navy Department respectively. The H.Q. of the Naval Air Service is at Tokyo, and Vice-Admiral M. Ando is at the head of it (1931).

It is understood that by the end of 1930 the Naval Air Service had 15½ squadrons complete, out of a projected total of 17 squadrons. This included training, airship and balloon squadrons, but excluded aircraft embarked in battleships, battle cruisers and cruisers.

These squadrons are based at the following aerodromes and bases: Kasumigaura (Fleet and Training Base), Yokosuka (Fleet and Training Base), Hiro, Tateyama, Sasebo, and Omura, Operational Bases.

The allocation of Flights and Squadrons is not available, but Japan has reported to Geneva (September, 1931) that their naval aircraft number 427 shore based, and 329 embarked in the ships of the Japanese Navy.

PERSONNEL.

In the same report to Geneva, the personnel of the Naval Air Service is given as 9,877 officers and men, and it is understood that between 500 and 700 of these are pilots.

The pilots for the Naval Air Service are mainly selected from volunteers from the Imperial Navy, but a few enter as cadets. Having been accepted, they go to Kasumigaura and Yokosuka for training, and receive in addition to the pay of their rank £6 per month in the case of an officer and £3 in that of an N.C.O.

These officers and N.C.Os. are under obligation to serve in the Naval Air Service "as long as the Emperor may require their services," and they do not return to the Sea Service. The observers are volunteers from the Fleet. They receive flying pay while on flying duties, though they still belong to the Naval Service in the same way as any other specialist officer.

CARRIERS AND TENDERS.

The carrier tonnage allowed by the Washington Conference to Japan is 81,000 tons, and she has now (1931) 68,000 tons, with another carrier building, which is to be completed in 1932. The Carrier Squadron consists of the Kaga, launched in November, 1921; the Hosho, November, 1921; and the Akagi, April, 1925. The Ryujo is building, and was launched at Yokohama on April 2, 1931. The Kaga, laid down as a battle cruiser of 42,000 tons, is now of 26,900 tons, speed 25 knots, and carries 60 aircraft. The Hosho is of 7,470 tons, speed 25 knots, and carries 26 aircraft. She is fitted with a Sperry gyro stabiliser. The Akagi, laid down as a battle cruiser of 42,000 tons, is now of 26,900 tons, speed 28·5 knots, and has accommodation for 50 aircraft, though only about 30 are carried. The Ryujo is to be of 7,000 tons, speed 25 knots, and is being electrically welded throughout. It is understood that arresting gear is used for deck landing on all carriers.

The Wakamiya, 7,600 tons, and carrying ten seaplanes, is the only aircraft tender the Japanese possess, though they have lately employed the oiler Notoro as such.

OTHER SHIPS CARRYING AIRCRAFT.

Commencing in 1927, the following allocations of aircraft have been made:—

To Battleships Nagato, Mutsu, Ise, Hyuga, Fuso and Yamashiro: three seaplanes each.

To Battle Cruisers Kongo, Haruna, Kirishima: three seaplanes each.

To 10,000-ton Cruisers Nachi, Myoko, Ashigara, Haguro, Atago and Takao: four seaplanes each.

To 1st Class Cruisers Kinugasa, Aoba, Kako and Furutaka: two seaplanes each.

To 2nd Class Cruisers Jintsu, Naka, Sendai, Isudzu, Nagara, Yura, Kinu, Abukuma, Kuma, Tama, Oi, Kitakami and Kiso: one seaplane each.

To each Submarine Tender: one "type 15" seaplane for reconnaissance duties.

The Japanese are still experimenting with the catapult, and both the compressed air and cordite types are in use.

As a result of the London Conference it is reported that the authorities were considering the establishment of 13 new naval air squadrons, to bring the total up to 30. When Admiral Kato, former Chief of the Naval Staff, relinquished his post in June, 1930, he is reported to have advocated the formation of 20 new air squadrons, while the Government are said to have appointed a commission to consider the expenditure of £20,000,000 on 16 new squadrons and 100 more seaplanes for embarkation with the Fleet.

FRANCE.

The interest of France in the Naval side of flying may be said to date from 1923, when a "Levasseur" with 600-h.p. "Renault" engine, was delivered at Villacoublay Aerodrome for the Naval Air Service (Aeronautic Maritime).

Up to September, 1928, France had separate Naval and Military Air Services, but due to the efforts of Monsieur Laurent Eynac the *Armée de l'Air* was created, and the Army and Navy Air Arms were brought under the control of the Air Ministry, which is also responsible for Civil Aviation.

ORGANISATION.

The Air Minister is Monsieur Dumesnil, and under him is the Chief of the Air Staff and Deputy Chief of the Air Staff, which appointments are always held by Naval and Military Officers. Rear-Admiral Esteva holds the latter appointment (1931).

For the purpose of maritime aviation France is divided into four regions. The 1st Region has its headquarters at Cherbourg; the 2nd at Brest; the 3rd at Toulon; and the 4th at Bizerta. Each region has an Air Officer Commanding who is an Admiral or a Naval Captain, and he has under him all air bases and stores depots except training bases, which, with the aircraft embarked in the Fleet, come directly under the Air Ministry. The aircraft embarked come under the Navy for operations only.

The aircraft of the Naval Air Service are organised in five divisions. One Division is allotted to each of the four Maritime Regions, and one Division is embarked. This represents a total of about 200 aircraft.

The Divisions are again divided up into fighting (chasse) escadrilles of 15 aircraft; reconnaissance (surveillance) escadrilles of 12 aircraft each; and bombing (bombardment) escadrilles of 12 aircraft each. The letters in the numbering of the escadrilles refer to these types; and the first number denotes the Region to which the craft belongs.

Personnel.

The Naval Section of the *Armée de l'Air* has a personnel of about 270 officers and 5,000 other ranks. The pilots of the Naval Air Service were originally volunteers and seconded from the fleet, and wore the uniform of their naval ranks and ratings with the addition of "wings." On formation of the *Armée de l'Air* these pilots were given the choice of returning to the Navy or reverting to the *Armée de l'Air*. The uniform of the *Armée de l'Air* is the one authorised for all flying personnel, though at present the Naval Section usually wear their naval uniforms. All naval pilots are trained at Hourtin. The naval observers are naval officer volunteers who have specialised in that Branch. A total sum of 320,467,305 frs. was provided out of the 1931–32 Air Force Budget of 1,739,474,000 frs. for the Naval Air Arm.

Carriers and Tenders.

The French have one carrier, the Béarn, laid down in 1914 as a battleship of the "Normandie" class; her construction was suspended during the War. She was redesigned and taken in hand at La Seine in 1923, being completed in 1927. The Béarn is of 22,146 tons, speed 20 knots, and can accommodate over 40 aircraft, but due to lack of space on the flying deck only a much smaller number can be worked. She carries the following escadrilles: 7C1, 7S1 and 7B1. Her speed on trial was barely 20 knots, but to such an extent has the arresting gear been developed that it is reported that the aircraft can be landed on with little or no wind speed over the deck. With this low speed, however, it is understood that difficulty is sometimes experienced when flying off.

The Commandante Teste, 10,000 tons, completed in 1929, acts as a tender to the Béarn, and carries a reserve of aircraft and spares from which the ships carrying aircraft can draw. The Commandante Teste will eventually mount 4 catapults. Other smaller craft which act as aircraft tenders are the Hamelin and the de Courcy.

Other Ships Carrying Aircraft.

Seaplanes are carried in the following cruisers: Edgar Quinet, Jules Michelet, Lamotte Picquet, Duguay Trouin, Primauguet, Duquesne, Tourville, Suffren, Colbert and Foch. Cruisers of the Duguay Trouin type carry one seaplane; those of the Duquesne type, two seaplanes; and the Suffren, Colbert and Foch, three seaplanes each. Catapults are in general use, and they are of the Penhoet type, which use compressed air.

ITALY.

When the Italian Armistice was declared (November 4, 1918), the Italian Naval Air Service consisted of 445 first line aircraft, 5,940 reserve aircraft, and 200 pilots and 130 observers.

From this time the Naval Air Service, which came under the

Ministry of Marine, was neglected until Signor Mussolini became Prime Minister in 1922. One of his first cares was for Italian service aviation, and he at once set up a committee to investigate and report on the conditions of service aviation, and to make recommendations for Italy's future flying services.

The result was that in 1923 a single air force was created called the *Regia Aeronautica*. It was under a Vice-Commissioner, who was in turn responsible to the Commissioner (Signor Mussolini), and the latter retained the position of Commissioner till 1929, when he appointed General Balbo to be Minister for Air.

Organisation.

The *Regia Aeronautica* is divided into four branches: (*a*) Independent Air Force; (*b*) Military Air Service; (*c*) Naval Air Service; (*d*) Colonial Air Service. Co-operation between the several Services is obtained through the Supreme Committee of Defence. Signor Mussolini is the head of this Committee, and the Ministers for Air, Marine, and War are members.

The Navy is responsible for the defence of the coasts of Italy, the Colonies and marine traffic. The role of the *Regia Aeronautica* (R.A.), which is allotted to the Navy, and which includes some shore bases and all aircraft embarked, is to assist in these duties. All bombing, torpedo, and fighting aircraft intended purely for coast defence come under the R.A. The aircraft embarked also come under the R.A. for administration, though they come under the Navy for operations and training.

The Naval Air Service actually consists of 13 sea reconnaissance squadrons (9 aircraft per squadron) and 25 aircraft embarked; but 8 bomber squadrons (6 aircraft per squadron), and 6 single-seater fighter squadrons (9 aircraft per squadron) are allotted by the R.A. to coastal defence, as follows:

Spezia: 2 Reconnaissance, 2 Sea Bombers.	Vigna di Valle: 2 Single-seater Fighters.
Pola: 1 Reconnaissance, 4 Sea Bombers.	Leghorn: 1 Reconnaissance.
Brindisi: 1 Reconnaissance, 2 Sea Bombers	Venice: 2 Reconnaissance.
Terra Nova Pausania: 1 Reconnaissance.	Augusta: 2 Reconnaissance.
Leros (Dodecanese): 1 Reconnaissance.	Naples: 1 Reconnaissance.
Orbetello: 4 Single-seater Fighters.	Taranto: 1 Reconnaissance.

Personnel.

The pilots of the R.A. hold either permanent commissions, short service commissions, or are seconded from other Services.

The permanent commission officer (R.A.) is trained at the Royal Air Academy at Casterta, which was established in 1923, and Officers of the Combatant Branch (R.A.) are admitted annually to the Army War School at Turin and the Navy War School at Leghorn.

The Navy may detach a limited number of both officers and men for duty with the R.A. for short periods, and their places are not filled in their parent Service during their absence. They wear the uniform of their Service with the addition of silver flying or other badges, instead of gold, like the R.A. It will, therefore, be seen

that most of the pilots of the Naval Air Service are R.A. Officers and N.C.Os. with only a few seconded naval officers and men.

Most of the Flying Training is carried out by contract with civilian flying schools under the supervision of the R.A., as this is found to save expense. The contract is 50,000 lire for each landplane pilot turned out and 60,000 lire for each seaplane pilot. Observers for the Naval Air Service are officers from the Fleet who have volunteered and specialised. Further schools for training pilots and observers are as follows:

Bombing School. H.Q. at Malpensa. Seaplane Section at Sesto Calende.
Fighter School. H.Q. at Furbara. Seaplane Section at Taranto.
Observers' School. H.Q. at Grottaglie. Seaplane Section at Taranto.

Carriers and Tenders.

Italy does not believe in aircraft carriers, but is concentrating on the improvement of her flying boats.

Italy has one aircraft tender, the Giuseppe Miraglia, which was reconstructed from the Citta di Messina during 1923–25. She is of 5,400 tons, speed 21½ knots, and carries seventeen aircraft. She has the usual facilities for the erection and repair of aircraft, and catapults are fitted at either end of her Flight Deck.

Other Ships Carrying Aircraft.

Aircraft which are embarked with the Fleet are solely for reconnaissance and gunfire spotting purposes, and they are all flying boats, as the Italian authorities do not favour floatplanes.

Aircraft are carried in the following ships:

Battleships: The Doria, Dulio, Cavour (in reserve), Cesare (in reserve), 1 M18 each; 1 Catapult each.

Cruisers: The Trento, Trieste, 3 M18 and 1 Catapult each; Giussano, Bande Nere, Barbiano, 2 S67 or Cant 25 or M771 and 1 Catapult each.

Aircraft Tender Miraglia, 11 M18 and 6 M7ter, with 2 Catapults.

Cruisers under construction: The Zara, Fiume, Gorizia, Bolzano and Pola, 3 P6bis or P6ter and 1 Catapult.

Cruisers projected: The Montecuccoli and Attendolo, 2 Catapults each.

The Catapults in general use are of two types: the Cagnotto which uses compressed air, and the Magaldi which uses cordite.

It is further reported that experiments are being carried out to produce a small seaplane suitable for use in submarines.

Albatross.

*** Particulars concerning the types of aircraft now in use in the Fleet Air Arms of the United States, Japan, France and Italy will be found in the Naval Reference Section.—Eds.

MERCHANT SHIPPING SECTION.

CHAPTER IX.

STANDING OF THE WORLD'S MERCHANT FLEETS.

THE annual survey of shipping, which is a feature of "Brassey" under the title of "Standing of the World's Merchant Fleets," has borne witness to the many changes from year to year. At times, when shipping has "boomed," the growth of the mercantile marines of the world has been so rapid that little more could be done than chronicle the incidents at breathless pace. When the general freight market has been depressed, there have been occasions when the construction of high-class passenger ships has maintained the output. Oil tankers have also provided a considerable amount of work, and the high proportion of tankers, compared with general cargo ships, is a noteworthy feature of post-War shipping conditions. Events last year were influenced by the tail-end of a tanker building "boom," coinciding with a severe freight depression, a lack of new shipbuilding contracts, and the colossal total of something like 13,000,000 deadweight tons of shipping laid up throughout the world. As many as 750 ships of an estimated deadweight capacity of 4,750,000 tons were laid up in Great Britain and Ireland alone. Such a series of conflicting circumstances has never arisen in shipping history before, and the shipping position and its future must naturally be viewed from a new angle. The questions raised embrace, as a matter of course, wonder whether there are not too many ships afloat, and, at times, even whether the prestige of the British mercantile marine is not imperilled. An examination of the available information leads to some interesting conclusions.

The most comprehensive statistics relating to shipping and shipbuilding are those issued by Lloyd's Register at various times during the year, and the publication annually of the "Register Book" affords an opportunity of indulging in a stocktaking of the mercantile marine of this and other countries. From an analysis of the figures given in the latest edition of this volume, it can be shown that the total tonnage owned throughout the world was 70,131,040 gross tons, of which steamers and motorships accounted for 68,722,801 tons, and sailing ships and barges for 1,408,239 tons. This huge fleet consisted of 32,344 individual ships, of which only 2,392 were sailing vessels.

The number and aggregate tonnage of sailing ships has declined year by year. There were 6,694 in 1913, and, except for the irregularity of the years 1916–20, when shipping conditions were very abnormal, the decline has been consistent. On the other hand, there has not been a corresponding increase in the number of power-

driven ships in relation to the growth of tonnage, the obvious explanation being that the average size of ships increases as time goes on. Some of these changes will be noted from Table I, where figures are given from 1913 to the present time, with the exception of a break in the years 1917–18 when the statistics were not compiled for reasons which are too well known to need repetition.

TABLE I.—TONNAGE OF THE WORLD.

Year.	Steam and Motor.		Sail.		Total.	
	No.	Tons.	No.	Tons.	No.	Tons.
1913	23,897	43,079,177	6,694	3,890,936	30,591	46,970,113
1914	24,444	45,403,877	6,392	3,685,675	30,836	49,089,552
1915	24,508	45,729,208	6,212	3,532,561	30,720	49,261,769
1916	24,132	45,247,724	6,035	3,435,412	30,167	48,683,136
1919	24,386	47,897,407	4,869	3,021,866	29,255	50,919,273
1920	26,513	53,904,688	5,082	3,409,377	31,595	57,314,065
1921	28,433	58,846,325	4,773	3,128,328	33,206	61,974,653
1922	29,255	61,342,952	4,680	3,027,834	33,935	64,370,786
1923	29,246	62,335,373	4,261	2,830,865	33,507	65,166,238
1924	29,024	61,514,140	3,932	2,509,427	32,956	64,023,567
1925	29,205	62,380,376	3,711	2,261,042	32,916	64,641,418
1926	29,092	62,671,937	3,523	2,112,433	32,615	64,784,370
1927	28,967	63,267,302	3,205	1,925,608	32,175	65,192,910
1928	29,387	65,159,413	3,021	1,795,246	32,405	66,954,659
1929	29,612	66,407,393	2,870	1,666,919	32,482	68,074,312
1930	29,996	68,023,804	2,717	1,583,840	32,713	69,607,644
1931	29,952	68,722,801	2,392	1,408,239	32,344	70,131,040

Owing to the War, statistics were not compiled regarding the vessels recorded in Lloyd's Register Books for the years 1917 and 1918. Tonnage figures for sailing vessels prior to 1919 are net tons; otherwise all tonnages are gross tons.

To-day sailing ships represent only 2 per cent. of the world's tonnage, against 8·1 per cent. in 1914. This statement is, however, subject to qualification, inasmuch as no record is, or can be, made of the large number of small craft under 100 tons gross in any of the figures now being quoted, nor are sailing ships owned in Japan included. The bulk of the sailing ships are distributed among few nationals. Of the present-day tonnage the United States owns 53·3 per cent. (749,931 tons), and next, in order of importance, are Great Britain and Ireland with 109,000 tons, Canada with 93,000 tons, Finland with 68,000 tons, Italy with 62,000 tons, and France with 53,000 tons. Contrary to general opinion, the Scandinavian countries do not possess large fleets of sailing ships. Denmark's total, for example, is only 40 ships of 12,056 tons, and Norway's is only 9 of 3,877 tons, though Sweden's is 89 of 25,893. If one eliminates barges, which are generally towed, and certain types of ship which come into the "sail" category simply because they are not fitted with engines for self-propulsion, and consequently are entirely outside the steam or motorship class, the world tonnage of sailing ships, in the proper use of the term commercially, amounts to only 674,000 tons, or less than 1 per cent. of the total. Of these ships, 33·2 per cent. (224,000 tons) are owned in the United States, 68,000 tons in Finland and only 16,000 tons in Great Britain and

Ireland. Incidentally, it may be recalled that not one of the full-rigged sailing ships is now owned in this country.

Sailing ship tonnage, while still continuing to take a place in the economics of sea transport, does so to such a little extent that in most cases its existence can be ignored, and certainly in statistical comparisons less confusion is caused by considering steam and motorships only. The figures in Table II show the tonnage owned by the principal maritime countries with the exception of Greece, whose mercantile marine passed the million tons mark only about five years ago and now consists of 539 ships of 1,397,782 gross tons. Disregarding sail tonnage, the changes which have taken place in the various mercantile marines at the years 1897, 1914 and 1931 are given in Table III. These figures show that during the 17 years 1897–1914, the net increase of the world's steam and motor tonnage was 26,797,000 tons, or 144 per cent. During the subsequent years, the increase was only 23,319,000 tons, or 51·4 per cent. of the pre-War tonnage.

TABLE II.—TONNAGE OWNED BY PRINCIPAL MARITIME COUNTRIES.
(In thousands of tons, '000 omitted.)

	Great Britain and Ireland.	United States (Sea-going).	Japan.	Germany.	Italy.	France.
1914	19,257	2,970	1,708	5,459	1,668	2,319
..	..	..	..	..	..	..
1919	16,555	10,782	2,325	3,503	1,370	2,234
1920	18,330	13,790	2,996	673	2,242	3,245
1921	19,571	14,697	3,355	717	2,651	3,652
1922	19,296	14,738	3,587	1,887	2,866	3,846
1923	19,281	14,597	3,604	2,590	3,034	3,737
1924	19,106	13,530	3,843	2,954	2,832	3,498
1925	19,441	12,949	3,920	3,074	3,029	3,512
1926	19,400	12,365	3,968	3,111	3,241	3,490
1927	19,309	12,070	4,033	3,363	3,483	3,470
1928	19,875	11,997	4,140	3,777	3,429	3,344
1929	20,166	11,835	4,187	4,093	3,285	3,379
1930	20,438	11,388	4,317	4,229	3,331	3,531
1931	20,303	10,999	4,276	4,255	3,336	3,566

	Norway.	Holland.	Sweden.	Spain.	Denmark.	Total all Nations.
1914	2,505	1,496	1,118	899	820	49,089
..	..	..	..	..	..	..
1919	1,858	1,592	993	751	702	50,919
1920	2,219	1,793	1,073	997	803	57,314
1921	2,584	2,226	1,160	1,165	964	61,975
1922	2,601	2,633	1,115	1,283	1,038	64,371
1923	2,552	2,626	1,208	1,260	997	65,166
1924	2,505	2,556	1,254	1,240	1,036	64,024
1925	2,680	2,601	1,301	1,185	1,060	64,641
1926	2,842	2,565	1,338	1,163	1,081	64,784
1927	2,824	2,654	1,365	1,162	1,060	65,193
1928	2,968	2,817	1,447	1,164	1,068	66,955
1929	3,324	2,939	1,510	1,162	1,056	68,074
1930	3,668	3,086	1,624	1,232	1,088	69,608
1931	4,066	3,118	1,705	1,227	1,145	70,131

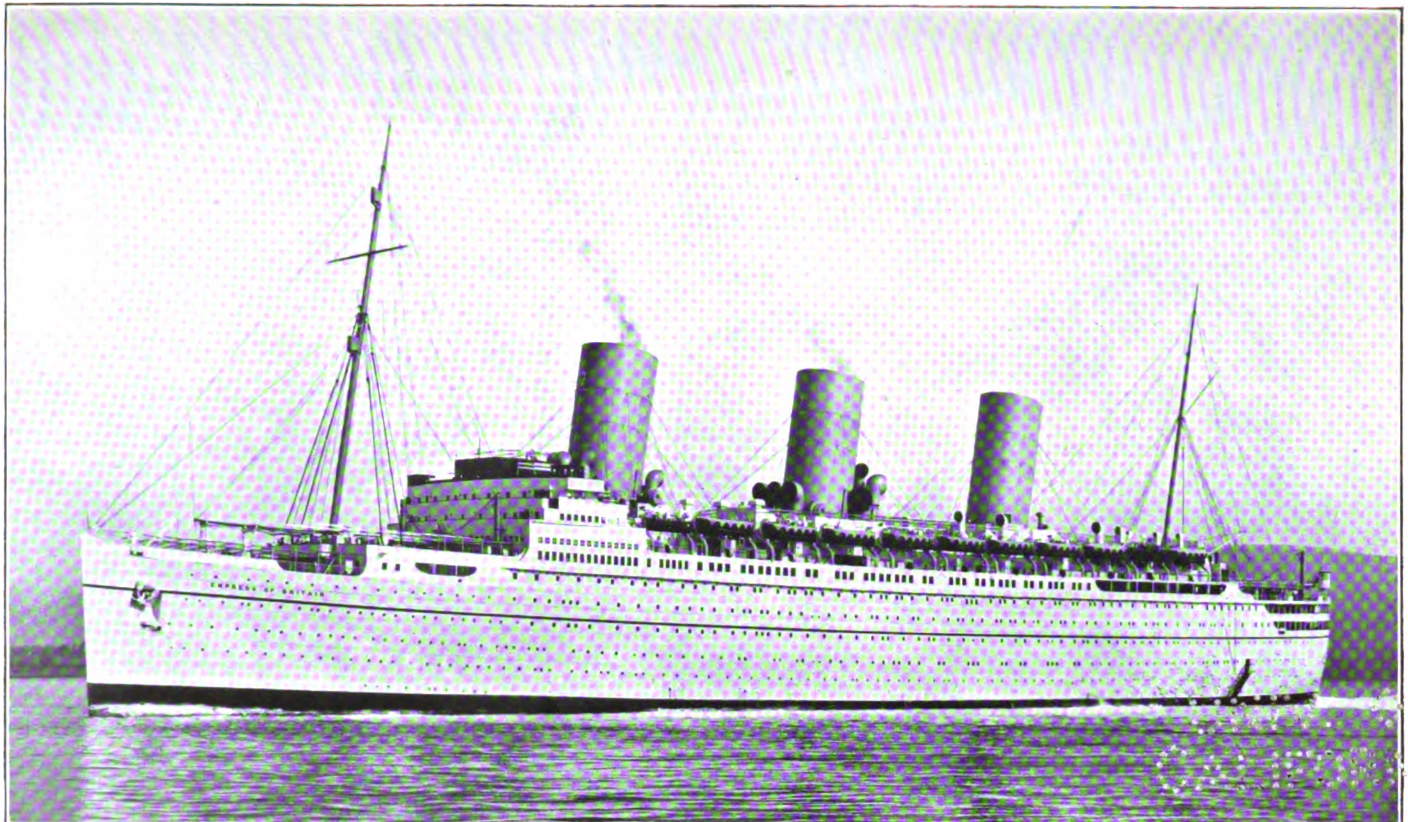
TABLE III.—COMPARISON OF STEAM AND MOTOR TONNAGE AT JUNE, 1897; JUNE, 1914; AND JUNE, 1931, AS RECORDED IN LLOYD'S REGISTER BOOK.

Countries.	1897.	1914.	1931.	Difference between	
				1914 and 1897.	1931 and 1914.
	Gross Tons.	Gross Tons.	Gross Tons.	Gross Tons.	Gross Tons.
Great Britain and Ireland . .	10,214,000	18,892,000	20,194,000	+ 8,678,000	+ 1,302,000
British Dominions	586,000	1,632,000	2,934,000	+ 1,046,000	+ 1,302,000
Denmark. . .	283,000	770,000	1,133,000	+ 487,000	+ 363,000
France . . .	955,000	1,922,000	3,513,000	+ 967,000	+ 1,591,000
Germany . .	1,550,000	5,135,000	4,226,000	+ 3,585,000	— 909,000
Greece . . .	164,000	821,000	1,398,000	+ 657,000	+ 577,000
Holland . . .	341,000	1,472,000	3,111,000	+ 1,131,000	+ 1,639,000
Italy . . .	402,000	1,430,000	3,274,000	+ 1,028,000	+ 1,844,000
Japan . . .	404,000	1,708,000	4,276,000	+ 1,304,000	+ 2,568,000
Norway . . .	565,000	1,957,000	4,062,000	+ 1,392,000	+ 2,105,000
Spain . . .	507,000	884,000	1,212,000	+ 377,000	+ 328,000
Sweden . . .	293,000	1,015,000	1,679,000	+ 722,000	+ 664,000
United States (Sea)	1,105,000	2,027,000	10,356,000	+ 3,182,000	+ 8,329,000
„ (Lakes)		2,260,000	2,438,000		+ 178,000
Other Countries	1,238,000	3,479,000	4,917,000	+ 2,241,000	+ 1,438,000
Totals .	18,607,000	45,404,000	68,723,000	+26,797,000	+23,319,000

Lloyd's Register have also made comparisons of a shorter period with equally interesting results. Thus, taking the 5 years 1909–1914, the world increase of 8,931,000 tons amounted to 24½ per cent. of the tonnage owned in 1909. During the five years June 1926 to June 1931, the increase (6,051,000 tons) represents only 9·6 per cent. of the world tonnage at 1926, an average yearly increase of less than 2 per cent. These figures, as will be explained later, are subject to qualification when the character of the tonnage is considered, as distinct from the statistical aggregates.

Continuing, however, the examination of the total figures and going back to the 17 year periods, it will be noted from the table that the largest increases between 1897–1914 were Great Britain 8,678,000 tons, Germany 3,585,000 tons, U.S.A. 3,182,000 tons, Norway 1,392,000 tons, Japan 1,304,000 tons, Holland 1,131,000 tons, British Dominions 1,046,000 tons, and Italy 1,028,000 tons. In the second period Great Britain dropped from nearly 9 millions to about a million and a quarter. Notable relative increases are in France, Italy, Holland, Japan, Norway and America. The last is the most remarkable because the net increase of 8,329,000 tons is held despite a decrease of 3,221,000 tons since 1922. An exception to these increases is Germany, whose totals are 909,000 tons below 1914. It may be recollected that after the War Germany was left with only 673,000 tons, both sail and power. To-day the figure is up to 4,226,000 tons.

Table IV shows the percentage of tonnage owned by the eight leading maritime countries, and how these proportions compare with the position at 1914 and 1897. In 1897 Great Britain and Ireland owned about 55 per cent. of the world's steam tonnage, Germany coming next with 8 per cent., France third with 5 per cent.,



CANADIAN-PACIFIC LINER EMPRESS OF BRITAIN.

(Builders, Messrs. John Brown & Co., Clydebank.)

and America fourth with 4 per cent. The relative positions were almost unchanged at 1914, except that by a fractional proportion Norway had ousted France which, consequently, took fifth place. America had come up very little, Germany had increased her proportion by 3 per cent., and Japan, Italy and Holland also accounted for a greater share. These changes were at the expense of the British proportion, which by then had dropped from 55 per cent. to 42 per cent. During succeeding years the shrinkage has become more acute, with the result that the British proportion is now only 30 per cent. The increase is less than 7 per cent. of the British tonnage owned in 1914, compared with an 83 per cent. increase in the tonnage of other countries.

TABLE IV.—PERCENTAGE OF TONNAGE OWNED BY PRINCIPAL MARITIME COUNTRIES, 1897, 1914, AND 1931.

	1897. per cent.	1914. per cent.	1931. per cent.
Great Britain and Ireland	55·0	41·6	29·4
United States (Sea)	4·0	4·5	15·1
Japan	2·2	3·8	6·2
Germany	8·3	11·3	6·1
France	5·1	4·2	5·1
Norway	3·0	4·3	5·9
Italy	2·2	3·1	4·8
Holland	1·8	3·2	4·5

While most of this disproportionate change is due directly to the War, all of it is not. There was a period, during the early years of the War, when British shipyards were practically idle, excepting for naval work. Not until 1917 was a serious effort made to counterbalance our losses of shipping, and the difficulties surrounding the reawakening of the shipbuilding industry, when labour was scarce, steel and other raw materials almost unobtainable, and skilled direction lacking because of the claims of munitions and active service abroad, need no emphasis. It is easy to realise the advantages possessed by neutral countries, of which America was one, in catering for the incessant demand for new tonnage. Neutral ships were at a premium, unhampered by the Shipping Controller with his " Blue Book " rates and the restrictions which both civil and military control of British shipping necessitated. Within two years America rose to be the greatest shipbuilding country in the world with, at one time, no less than 4,186,000 tons in hand, a figure exceeding by 477,000 tons the highest corresponding British figure, and something like a million tons more than was ever building at one time in the world before the War—or since it, if the abnormal years 1918–21 are excepted. The effect was to raise the sea-going tonnage owned in the United States (sail excluded) from 2,026,908 tons at 1914 to 13,576,640 tons in 1922.

The story of the efforts to find useful employment for the whole of this American tonnage, once the shipping slump set in, is well known. There soon accumulated in the Hudson River and elsewhere a huge fleet which no one wanted, and which, even with the effluxion of time, could not be re-absorbed by the freight market. Notwithstanding all the devices of State assistance which the

fertile brains of Americans could evolve, it became necessary to face the inevitable, and large numbers of ships were scrapped. By the middle of 1931 the American fleet had been reduced by 3,221,000 tons to 10,356,000 tons. This left America with 8,329,000 tons more than she owned at the outbreak of War, and gave her 15 per cent. of the world tonnage compared with 4½ per cent. at 1914. Even this amount appears economically excessive, because during the past year there were as many as 270 Shipping Board ships laid up, the total idle American fleet being 660 ships of 2,660,000 tons.

The case of America has been taken first because it is the most spectacular. Other countries have also increased their fleets by considerable amounts. Japan comes next to America in this respect with 2,568,000 tons, or 150 per cent. more. Norway follows with 2,105,000 tons more, or 108 per cent. Italy, Holland and France show increases of 129, 111 and 83 per cent. respectively. The British Dominions, with their increase of 1,302,000 tons—curiously enough exactly the same as the increase for Great Britain and Ireland in the same period—are rather an indefinable mixed bag. Included in this fleet are 593 ships of 677,463 tons owned in Australia and New Zealand, 795 of 1,344,374 tons owned in Canada (of which 150 of 384,703 tons are employed on the Great Lakes), 119 of 273,431 tons owned in Hong Kong, and 150 of 191,551 tons owned in India and Ceylon. The total merchant fleet of steamers and motorships owned throughout the British Empire is 9,940 ships of 23,127,000 tons. That is approximately double the American total and a third of all steamers and motorships owned throughout the world.

In estimating the effect of these changes on the overseas carrying capacity of the principal maritime countries, it is necessary to eliminate several classes of tonnage unsuitable for a variety of reasons. This has been done in a table which has for many years been a feature of the annual survey in "Brassey," and the latest figures are shown in Table V.

TABLE V.—TONNAGE AVAILABLE FOR CARRYING GOODS AND PASSENGERS.

	Gross Tons.	Gross Tons.
Total Tonnage of the World	—	70,131,040
Sailing Ships	1,408,239	
Oil Tankers, 1,000 tons and over	8,549,827	
Oil Tankers, under 1,000 tons	100,314	
Trawlers and other Fishing Vessels	1,009,848	
Tugs and Salvage Vessels	368,888	
Steam Barges and Dredgers	850,855	
Paddle Steamers	305,719	
Lake vessels, U.S.A.	2,545,341	
Lake vessels, Canada	394,606	
		15,533,637
Steam and Motor Tonnage available for goods		54,597,403
Comparative figure for 1930		55,067,368
,, ,, ,, 1929		54,080,656
,, ,, ,, 1928		53,332,592
,, ,, ,, 1927		52,182,481

The process of exclusion can be seen from the table. Taking the total as a basis, sailing ships are excluded because they are now relatively uninfluential on freight rates. All oil tankers are omitted,

because in the transport of oil or, in recent years, molasses and one or two other liquid cargoes, they carry on a specialised business. Then there are trawlers and other fishing vessels, tugs and salvage craft, steam barges and dredgers, paddle steamers and vessels on the Great Lakes. These together account for about 22 per cent. of the world tonnage and reduce the available carrying capacity to 54,597,000 tons.

It will be noted that during the last few years there has been little change, and that the 1931 figure is actually lower than it was a year before. The explanation lies partly in the smaller number of cargo ships built in recent years, the shipyards having made good the deficiency in this class of work by increased oil tanker construction, which is illustrated by Tables VI and VII.

TABLE VI.—PROPORTION OF SHIPBUILDING CONSTRUCTION ABSORBED BY OIL TANKERS.

	Oil Tankers.	Total Shipbuilding.	Percentage Tankers.
Jan. 1, 1922	793,193	4,457,393	18
„ 1923	300,128	2,954,318	10
„ 1924	175,164	2,444,336	7
„ 1925	309,270	2,470,436	12
„ 1926	308,439	2,069,545	15
„ 1927	371,520	1,933,027	19
„ 1928	744,668	3,118,721	24
„ 1929	361,972	2,618,001	14
Jan. 1, 1930	627,756	3,110,880	20
Oct. 1, 1930	1,034,144	2,569,036	40
Jan. 1, 1931	907,298	2,326,086	39
Oct. 1, 1931	505,258	1,531,120	33

TABLE VII.—PERCENTAGE OF TANKERS TO TOTAL WORLD TONNAGE (SAIL EXCLUDED).

	Total World Tonnage (Sail excluded).	Tankers.	Percentage Tankers.
	Gross Tons.	Gross Tons.	
1914	45,404,000	1,479,000	3
1919	47,897,000	2,929,000	6
1920	53,905,000	3,354,000	6
1921	58,846,000	4,419,000	8
1926	62,672,000	5,665,000	9
1928	65,159,000	6,620,000	10
1929	66,407,000	7,071,000	11
1930	68,024,000	7,628,000	11
1931	68,723,000	8,650,000	13

Another form of analysis on rather different lines has been made by Lloyd's Register, and the result is given in Table VIII. This seeks to show the larger ocean-going steamers and motorships available for general cargo and passenger purposes. In addition to the elimination of such craft as already mentioned in discussing Table V, there are also excluded wood vessels, vessels of less than

5,000 tons gross and vessels more than 25 years old (except a few which although older are still capable of high speed). There are not many wooden vessels built to-day, although they were turned out in large numbers by America during the War years. Altogether there are about 5,000 wood and composite ships of about 1½ million tons, the average size being, therefore, 300 tons. More than half are owned in the United States.

TABLE VIII.—TONNAGE OF THE LARGER OCEAN-GOING STEAMERS AND MOTORSHIPS AVAILABLE FOR GENERAL CARGO AND PASSENGER PURPOSES COMPARED WITH TOTAL STEAM AND MOTORSHIPS (June, 1931).

Countries.	Total Steam and Motor Tonnage in Table III.		Ocean-going Tonnage.	
	Tonnage Owned.	Percentage of World Total.	Tonnage Owned.	Percentage of World Total.
Great Britain and Ireland	20,193,677	29·38	10,360,821	38·43
United States	12,892,252	18·76	5,109,770	18·95
Germany	4,226,050	6·15	2,133,772	7·91
Japan	4,276,341	6·22	1,754,649	6·51
Holland	3,111,357	4·53	1,699,377	6·30
France	3,513,179	5·11	1,624,634	6·03
Italy	3,273,525	4·76	1,499,807	5·56
Norway	4,061,629	5·91	543,170	2·01
Other Countries	13,174,791	19·18	2,237,008	8·30
World totals	68,722,801	100·00	26,963,008	100·00

On the basis of the analysis in Table VIII, the tonnage owned in Great Britain appears in a favourable light. More than half comes into the category of the larger ocean-going steamers and motorships, and the proportion of the world tonnage rises from 30 per cent. to nearly 39 per cent. Holland and Germany also show a strong position, but Norway, which owns 6 per cent. of the world tonnage, drops to 2 per cent. Since a somewhat similar deduction, published in "Brassey" two years ago, was disputed by Norwegian shipping interests, it may be explained that the lowness of this figure is influenced by the large proportion of tanker tonnage owned in Norway. The discrepancy is even greater to-day than it was at that time, because of the large number of tankers comprised in the recent tanker-building boom which have been constructed for Norwegian account. Two years ago there were 117 tankers of 781,575 tons (of 1,000 tons and upwards) owned in Norway, compared with 204 of 1,450,470 tons owned at the beginning of July, 1931, and the figure has increased since.

The influence of the development of the use of oil in the broadest sense of the word has never yet been properly estimated. It is possible to discover with some precision the growth of the oil-tanker fleet, the development of the motorship, the increased use of oil fuel and the proportion of work which this provides for the shipyards in new construction. The facts can be ascertained and tabulated, as they are in this article. It is less easy to visualise the

interests which all these changes have displaced. The loss of coal carrying and its reaction on the movement of other cargoes is an example. The diversion of trade routes because of these changes is another. The definiteness of the change is, however, very clearly shown in Table IX, where it will be seen that in 1914 89 per cent. of the world's tonnage burnt coal. To-day the proportion is only 56 per cent., and none of the efforts which have been made by coal interests in recent years has availed to check the decline.

TABLE IX.—PERCENTAGE OF TONNAGE FITTED FOR EMPLOYING OIL OR COAL AND PERCENTAGE OF SAILING SHIPS TO THE GRAND TOTAL.

	Percentage of Total Gross Tonnage.				
	1914.	1922.	1929.	1930.	1931.
Sailing vessels and sea-going barges	8·06	4·70	2·45	2·27	2·01
Oil, etc., in internal combustion engines	0·45	2·35	9·73	11·63	13·45
Oil fuel for boilers	2·65	22·34	28·53	28·53	28·52
Coal	88·84	70·61	59·29	57·57	56·02
	100·00	100·00	100·00	100·00	100·00

The decline of the sailing ship has already been discussed. The change has been fairly gradual. Not so the development of the oil-burning steamer and the motorship. At July 1914 the tonnage of ships fitted for burning oil fuel for steam raising was 1,310,000 tons. It was 5,337,000 tons at the end of the War, and in two years more had grown to 12,797,000 tons. That was the period of wholesale conversions from coal to oil in passenger ships. The figure to-day is just over 20 million tons, of which 8,187,200 tons are owned in the United States and 5,545,800 tons in Great Britain and Ireland. No other country exceeds a million tons, the nearest approach being Holland with 925,000 tons.

TABLE X.—NUMBER AND GROSS TONNAGE OF MOTORSHIPS.

	Motorships (including Auxiliary Vessels).	
	No.	Gross Tons.
July, 1914	297	234,287
„ 1919	912	752,606
„ 1920	1,178	955,810
„ 1921	1,472	1,248,800
„ 1922	1,620	1,542,160
„ 1923	1,795	1,666,385
„ 1924	1,950	1,975,798
„ 1925	2,145	2,714,073
„ 1926	2,343	3,493,284
„ 1927	2,552	4,270,824
„ 1928	2,933	5,432,302
„ 1929	3,246	6,628,102
„ 1930	3,696	8,096,337
„ 1931	4,080	9,431,433

Table X is almost the life story of the motorship. Including auxiliary sailing ships, there were only 297 vessels of 234,287 gross

tons in existence in 1914. Development remained slow during the War years, and at 1919 the figure was 912 ships of 752,606 tons. The million mark was not passed until 1921, and the two million mark until 1925. Thereafter the annual increase became more rapid and has exceeded a million tons a year during the last four years. The consequence is that there are now more than 4,000 motorships, with an aggregate tonnage of something like 10,000,000 tons. With about 8,000 ships "off coal," and consuming oil in one form or another, with all the commercial uses for petroleum products (and molasses now that this commodity has taken to tankers), and with all the demands from the road users, oil tankers, a rarity twenty years ago, are as familiar sights on the Seven Seas as colliers. They represent no less than 13 per cent. of the world tonnage—against 3 per cent. at 1914; the changes are shown in Table VII. This process has also had its influence on the shipyards, which at one time (Table VI) were so busily occupied with tankers that the proportion was as high as 40 per cent. In certain yards this made up for the absence of other classes of work, and, inferentially, by providing work for idle hands to do, eased the pressure of tempting offers to cargo boat owners which might have accentuated the glut of general cargo tonnage.

The American War-produced tonnage, to which reference has been made, is now getting considerably older. Additions in recent years have been almost negligible, although just at present there is a wave of new construction, mainly of high-class passenger liners whose owners are receiving large mail subsidies. Out of the 10,356,000 tons only 593,472 tons (6 per cent.) are under five years old, 370,000 tons are between 5 and 10 years old, and 7,426,534 tons (72 per cent.) are between 10 and 15 years. For reasons already given, not all of this tonnage can be regarded as first-class. Of tonnage owned in Great Britain and Ireland 22·5 per cent., representing 1,271 ships of 4,543,156 tons, is less than 5 years old. The only countries with larger proportions are Norway with 34 per cent. (1,372,186 tons) and Holland with 25 per cent. (786,863 tons). France, Italy and Japan vary between 12 and 14 per cent. less than 5 years old. Eighty-three per cent. of the tonnage registered in Great Britain is under 20 years old, while the proportion for the tonnage owned abroad is about 70 per cent. Further details for various countries are shown in Table XI.

The annual wastage of shipping is more perplexing than the yearly accretion of tonnage, because it is a variable quantity which almost defies estimation. Figures for vessels broken up show remarkable differences from year to year. Even excepting the abnormal years 1915–1920, when the yearly average was only about 10,000 tons, the annual variation during the last 20 years has ranged from about 80,000 tons to more than a million tons. During 1907, 83 ships of 157,000 tons were broken up. During 1913, which was a good shipping year, only 76 of 88,000 tons were similarly dealt with, but during 1910 the figure was as high as 128 ships of 246,000 tons. Post-War figures are interesting, as Table XII shows.

TABLE XI.—AGE OF STEAMERS AND MOTORSHIPS (LLOYD'S REGISTER).

Country in which Owned.	Under 5 years.		5-10 years.		20-25 years.		25 years and over.		Total Tonnage Owned.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Great Britain and Ireland	1,271	4,543,156	1,141	4,467,339	811	1,731,562	1,721	1.671,507	7,781	20,193,677
America (Sea)	136	593,472	136	370,234	188	448,134	476	733,594	2,729	10,356,077
Denmark	86	253,119	123	205,160	54	48,682	179	219,735	677	1,133,201
France	137	478,634	174	687,292	214	354,904	381	464,928	1,521	3,513,179
Germany	267	884,365	425	1,240,651	265	328,986	517	649,768	2,151	4,226,050
Greece	8	30,836	6	16,971	70	256,969	364	801,767	539	1,397,782
Holland	298	786,863	189	621,037	132	249,236	236	166,349	1,410	3,111,357
Italy	99	399,885	126	551,426	121	301,041	425	962,721	1,101	3,273,525
Japan	199	551,492	222	382,934	137	300,181	462	926,011	1,969	4,276,341
Norway	338	1,372,186	250	570,423	212	256,347	484	501,490	1,981	4,061,629
Spain	73	192,398	47	111,528	46	50,708	337	441,394	771	1,211,817
Sweden	85	298,305	94	244,851	138	156,845	670	523,789	1,339	1,678,776
World total	3,726	11,866,310	3,478	10,518,604	3,220	6,124,543	8,592	11,664,698	29,952	68,722,801

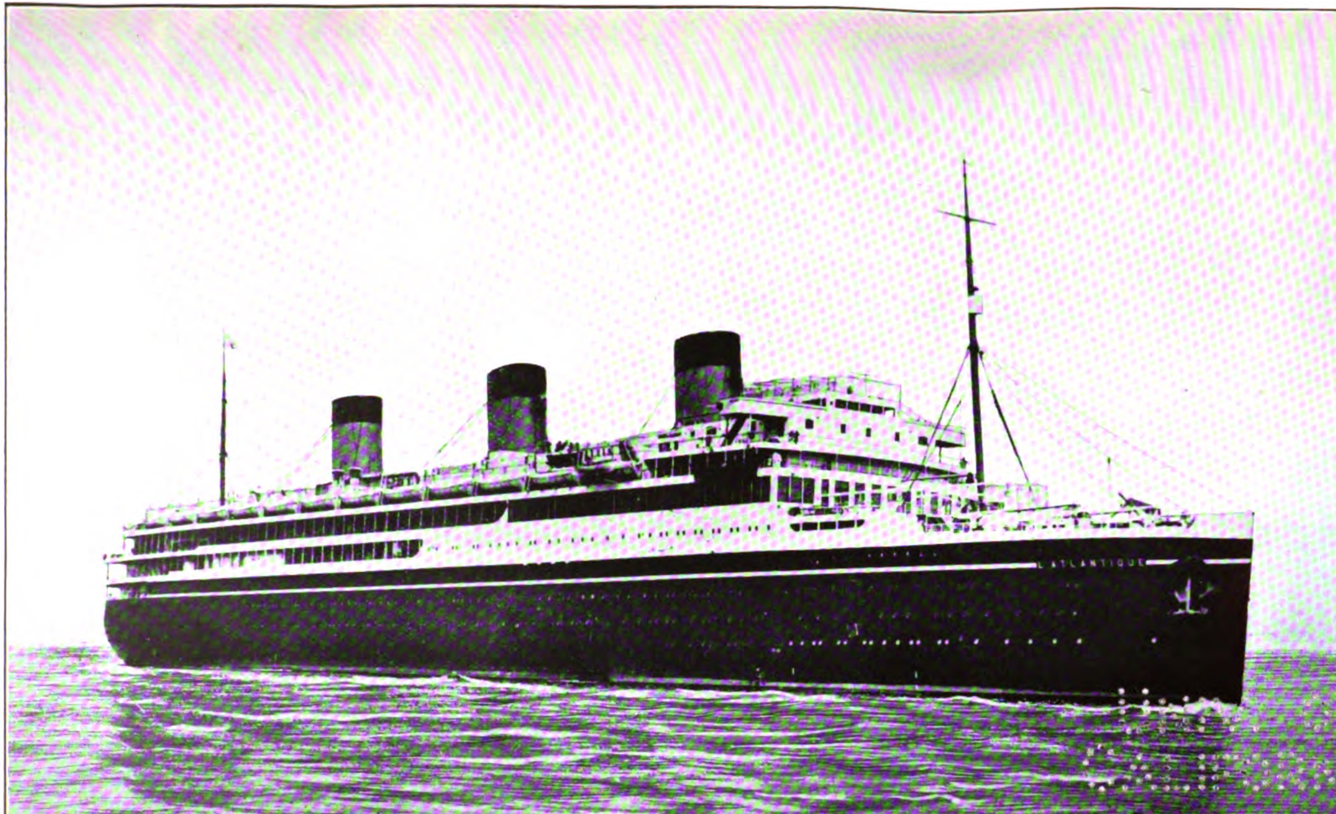
TABLE XII.—STEAMERS AND MOTORSHIPS BROKEN UP.

	No.	Tons.
1921	34	77,545
1922	160	315,110
1923	385	962,506
1924	485	1,174,258
1925	273	653,046
1926	358	798,633
1927	189	402,698
1928	296	735,547
1929	352	943,609
1930	311	848,538

Conflicting circumstances account for these variations. During a shipping boom there is a demand for tonnage, even old tonnage. During a slump, or rather after the slump has had time to develop, the older ships go to the shipbreakers. The conditions surrounding 1931 were peculiar. What might have proved a wholesale breaking-up process was checked by the general industrial slump which brought down the market value of scrap metal to a point where it did not pay to break up. This situation suggests that when the price of steel revives, and shipbuilding improves (55–65 tons of scrap are used for 100 tons of new steel of shipbuilding quality), the rate of scrapping will be accelerated.

In addition to the breaking-up process there is also loss by sea casualty. This, however, is considerably less than it used to be. For example, the average yearly proportion of steam tonnage lost during the years 1926–30 was only 0·72 per cent., whereas during 1909–13 it was 1·17 per cent. The development of navigational aids, the greater reliability of machinery under stress of heavy weather, and possibly also the number of idle ships, have no doubt been contributory factors. Combined figures for wastage from these two sources are given in Table XIII.

There is sometimes speculation as to the tonnage of ships which at a normally progressive rate should be afloat and in service to-day. Such figures, however, fail to take proper cognisance of the changes in quality of carrying ability of modern ships, their greater speed, the acceleration of loading and unloading, and the greater number of voyages they can make—their greater turnover of cargoes, as it were. These changes have all had an influence on the distribution of passengers and cargoes. The development of oil fuel has made it practically impossible for an owner to contemplate burning coal in any large passenger ship he may order in the near future. Passengers would not tolerate the dirt, delays and discomfort incidental to "coaling ship." The carriage of oil fuel in double-bottoms has released other parts of the ship for cargo or for greater passenger amenities. The competition of the motorship with its very large radius of action without the need of refuelling is another factor. The motorship has set the pace for speedier cargo liners and the older steamships are finding it more and more difficult to maintain their prestige in the eyes of shippers. The mobility of modern ships has



CIE. DE NAVIGATION SUD-ATLANTIQUE'S LINER L'ATLANTIQUE.

(Builders, Société des Chantiers et Ateliers de Saint-Nazaire, Penhoët.)

TABLE XIII.—TONNAGE LOST OR BROKEN UP.

Year.	Steamers and Motorships.		Sailing Ships.	
	No.	Tons (gross).	No.	Tons (net).
1916	1,288	2,724,041	511	284,224
1917	2,605	6,607,261	748	520,206
1918	1,294	3,332,791	325	159,919
1919	425	524,172	241	112,658
				(gross)
1920	370	518,595	215	138,959
1921	344	536,537	215	137,720
1922	511	743,866	205	143,946
1923	709	1,456,870	259	259,909
1924	777	1,614,662	239	243,017
1925	553	980,794	186	161,241
1926	656	1,226,873	182	117,070
1927	469	852,398	154	139,671
1928	584	1,220,176	121	94,471
1929	672	1,458,665	120	84,937
1930	561	1,232,521	107	80,763

WAR LOSSES INCLUDED IN THE ABOVE TABLE.

Year.	Steamers and Motorships.		Sailing Ships.	
	No.	Tons (gross).	No.	Tons (net).
1916	942	2,189,079	245	139,609
1917	2,211	5,957,913	523	392,449
1918	911	2,674,428	141	69,744

rendered fewer ships necessary for the world's requirements. The one clear fact is that shipping expansion has been almost at a standstill for some time. A revival of overseas transport would result in the temporary recall to service of the older ships which have been feeling the stress of competition so severely that they have all but succumbed. But a shipping revival is inevitably accompanied by a shipbuilding revival, which implies the speedy production of an increased number of modern ships capable of making profits where the older vessels fail. The resuscitation of the older ships can, in these circumstances, be only temporary, and, consequently, a large proportion of the pre-War tonnage, and the immediate post-War ships hastily built on pre-War conceptions, must go to the scrappers. The deadweight of surplus tonnage will be removed, and probably it will be necessary to alter our conception of 20 years as the useful life of a ship. Under the conditions just enumerated, it may be necessary, for a time, to look askance at anything older than ten years, and to put something like 15,000 ships (30,000,000 tons) of the present formidable total into the limbo of antiquity or obsolescence. This prospect is, doubtless, alluring to the shipbuilder.

JOHN P. TAYLOR.

CHAPTER X.

OLD SHIPS AND NEW SHIPS.

THE construction of new passenger ships has been going at a rate which few realise, because, during the last ten years or so, the work has been carried out in so many different countries that the collective effort has almost escaped general notice. Though shipbuilding has been at a low ebb, examination of the statistics shows that the addition of high-class liner tonnage and, particularly, passenger ships has formed a substantial part of the output. Even during the last two years, when a record number of oil tankers has been built, some very noteworthy passenger liners have been added to the merchant fleets of the principal maritime nations. It is sufficient to recall the Bremen and Europa, the Ile de France, and the Empress of Britain and Strathnaver, as typical of Germany, France, and the British Empire, while glancing at Holland, Italy, the United States, and Japan for many more evidences of this progress. The building of these is in pursuance of national or ordinary commercial aspirations, the motives springing from so many impulses that co-ordination of effort is impossible even were it considered desirable, which, apparently, it is not.

The introduction of the 1,000 ft. transatlantic liner must be regarded as the crowning achievement, setting a new standard of travel and speed. It is known that the directors of the Cunard Line are aiming at two such liners, to take the place of the three which at present are necessary to maintain the regular weekly mail service, —and presumably there must be two ships, else the scheme is not economically possible. These two ships, in supplanting three, will raise in acute form the problem which, in varying degrees of intensity and on different routes, all the other new ships are creating. It is a problem which is less easy to solve now, because the tendency of thought and design has been to produce ships for specialised services, for tastes on one route which are different from those on others. Ships built to spend the bulk of their time in cold latitudes are rarely successful for tropical service unless a considerable sum is spent on ventilation and in increasing the open-air deck area. On the other hand, a vessel constructed primarily for certain Eastern trades would take unkindly to the buffetings of the North Atlantic.

This difficulty has always been present, and is well recognised. The more serious problem confronting owners who still wish to keep the older ships running is to open up new trade routes. Any transfer from the North Atlantic to the Far East run, such as is suggested in Italy in order to make room on the New York service for the Rex

and Conte di Savoia, can only intensify competition on a route already well supplied with modern tonnage by such lines as the P. & O. and the Nippon Yusen Kaisha, to mention only two names as emphasising the point. These two lines, in turn, have built new and larger ships, and have to face the problem not only of filling the new vessels, but also of finding an outlet, either directly or through disposal, for their older ships. The South American run has a plethora of converging lanes of traffic which appeal from different aspects. The Australian service is amply catered for, and during the economic difficulties both in the Commonwealth and in Europe there is no prospect of the ships now in service being used to a proper capacity. Other routes present similar difficulties.

Lower fares are not enough to increase travel. Experience with the tourist class on the North Atlantic has shown that the large volume of tourist traffic has been gained at the expense of the more costly grades. Popular travel on this route, apart from the tourist class, falls largely into two categories—the latest and fastest liners on the one hand, and the cabin-class liners on the other. Many travellers remain faithful to their old allegiances, even to their first loves, now between twenty and thirty years old. But not all travellers are old hands, and the books of the passenger departments show how traffic is influenced by fashion. The largest or the fastest ships command the cream of the traffic, and the public is fickle and cosmopolitan in its transferences. The very nature of the population of the United States, to which the eyes of the passenger managers are invariably turned, provides that international nonchalance which favours in turn the mammoth ships of Germany, France, and Great Britain, according to the whim of the moment. Experience over a long period has proved that those shipowners who, on this route, went out for the spectacular big or fast ship—preferably both big and fast—were " on velvet " so long as their ships were in fashion, provided, of course, that they were adequately backed on the constructional and commercial sides, or, in other words, did not let their imagination run riot. The events of the last five years have demonstrated beyond doubt that what held in this respect before the War holds to-day.

This policy, however, through the creation of an insistent demand for "the last word"—all new ships in the eyes of the passenger agents' departments must be " the last word "—has thrown into strong relief the defects of the older ships, the term "older" being employed in a sense which embraces more than mere age. It would be invidious to mention names, but every one knows there are good or bad ships of all ages. There are good ships now past the allotted span of 20 years which command a loyal and enthusiastic clientèle. There are much younger ships which are looked upon with disfavour. Some are like individuals, good-looking, well groomed, and outwardly of good behaviour, but liable on the slightest provocation to display their inherent weaknesses. Unpunctuality in arrival is one of the major sins which cannot long be hidden from the public. Shipping managements may have their own grievances against units of a fleet. There are the excessive fuel eaters, and there are those which

incessantly require repair. There are happy ships, just as in the Navy, and there are ships in which the personnel never harmonises. There are ships which roll excessively, just as there are those which, if their captains are to be believed, must still have the original unspilled—or unspillable—wineglassful of water on the saloon table. Some ships "just don't catch on," notwithstanding the popularity of their sisters.

Personal tastes differ. Some people instinctively take a fancy to a ship, the accommodation of which is arranged in a certain way, or which is decorated in a style that is anathema to others. Gradually preferences are tending towards single and two-berth cabins, towards cabins which look more like bedrooms ashore than they can with bunks and folding wash basins. Few travellers now cherish the "ship" tradition; that surely went when liners exceeded 10,000 tons. In a few years it will have disappeared from the big liners—even the small ones are breaking away from it—as completely as the desire to travel in a sailing ship, with its hard fare and oil lamps. Consequently, when the day arrives for weeding out, age will not be the only criterion.

A man is as old as he feels. A ship is as old as public opinion is progressive. The fact is that the new ships are so very new that they are making the other ships look very old. The decorative sense of the travelling public has been educated up to the period styles and other harmonious effects. Ships which were prime favourites ten or fifteen years ago—the War years leave an ugly scar in the transitional period of our big liners—strike a jarring note when one lives in them for days on end. There are the imitation stained glass windows, the pillars which have no beginning on the floor and no end on the ceiling, and the skylights and domes which shriek incongruity. There are the first-class smoking-rooms which look now like saloon bars in a side street. The introduction of a dancing floor into the dining-saloon only intensifies the extemporisation. The inside cabins seem more inside than ever; bath and toilet accommodation less convenient than it was; and the hot water service—manual, in diminutive jugs—more dilatory and out of time with the hour at which one wishes to dress.

Recognition of these accumulated disabilities has already come in the cheapening of rates and in the lowering of grades. The term *anno domini*, applied with a shrug of the shoulders to mortals, has its own significance when applied to ships. Time lays a heavy hand on passenger tonnage.

These are the outward and visible signs of age. It has already been suggested that, for other reasons also, shipping managers would be glad to cast some of these time-scarred warriors aside. Crankiness and all that is implied in the term will suffice for a general reason. Machinery troubles become intensified as time goes on. Upkeep is an increasing charge. In places where shipping men congregate stories are told of that bug-bear corrosion, a complaint of which much more is heard since oil fuel has been generally adopted. Ships ten years old are far from immune from its most serious consequences. Doubt is cast on the steel of that period as being the best to with-

stand the ravages of this modern evil. Oil tanker concerns are not alone in suffering from this cause.

Then there are the ships which are too slow. Not all of these are old. Some, in fact, are quite new. But international competition has put them immediately in the background. They are, so far as passenger attractiveness is concerned, second-rate ships, while yet a first-rate charge on their owners. The bold course of taking out the original engines and putting in more powerful ones has been adopted, notably by Dutch and German lines. That is one way of coming out on top. It requires capital, and it calls for courage—courage to admit that second thoughts may be better. Other lines might copy these examples with advantage. Yet not all ships are suitable. Indeed, not all ships on which the experiment has been tried have been successful. Surgical operations call for skill and nerve, not for compromise.

Then there are the real old-stagers, the hangers-on. How long will they continue to be a burden to their owners, the poor relations at the feast? There are still too many of them, notwithstanding that some have lately been sold for breaking up. The tragedy is that scrap metal is cheap, and the ships physically sound. Useless for conversion to cargo ships in a world already glutted with tonnage, unwanted nowadays for whaling factories, their occasional opportunities become less and less frequent. Experience has shown the folly of turning them over to an inferior maritime nation with low running costs and an absence of bureaucratic surveillance. Indeed, some of the inferior nations have themselves become superior shipbuilders. The spread of civilisation has reduced the numbers of travellers of gregarious instinct who gave such purchasers, in days gone by, those wonderful opportunities of cramming the old ships. Go they must, and the sooner the better. The process of elimination has already been much too slow for an age which is progressive, and the shipping business would be better and healthier for action on recognition of the fact that these lame ducks are a useless encumbrance on the oceans.

VIATOR.

CHAPTER XI.

State-Owned Shipping.

Although much of the experience of shipowners in 1931 was depressing, there was some relief here and there from the general gloom. The improvement which was noticeable in various directions towards the end of the year would have been better appreciated but for the troubles which in 1930 and in the greater part of last year caused an enormous amount of shipping to be unemployed, and though in the closing weeks of 1931 ships began to be returned to service the idle tonnage could at best be reduced only gradually.

Perhaps in future owners will look back on the closing quarter of 1931 as marking the beginning of an improvement in the volume of oversea trade. However that may be—and unfortunately any recovery was subject to severe setbacks—they will have cause to remember the year for two important developments affecting a subject on which feeling has long run high. In Canada a Select Standing Committee of the House of Commons investigated the working and financial results of the Canadian Government Merchant Marine, and in Great Britain and Ireland the electors voted in October in a way which made it clear that the State ownership and control of shipping were not likely to become questions of practical politics in these islands—at any rate for some time to come.

In the light of experience, the inclusion of State ownership and control of shipping as a feature of the Socialist programme at the general election in the autumn was remarkable. Experience is a fine, if costly, teacher. It happens that in Great Britain the experience has not been fully available, and so, apparently, its lessons have not been properly learned. There have been object lessons in other countries, but some politicians have evidently either lacked knowledge of what happened abroad or have deliberately shut their eyes and closed their ears to the lessons which followed from events overseas. In Great Britain the movement of ships during the War came under the control of a Government department, manned by many of the best brains in the shipping industry, the single purpose of which was to ensure that every ton of shipping was employed to the best advantage in a great national emergency, and a number of ships built on the simplest lines were constructed to the order of the Government. Immediately the extraordinary conditions of the War ceased those responsible for the control of the shipping during the crisis successfully urged the Government to dispose of the vessels it had built and to release control of all shipping as soon as millions of men were repatriated.

How sound the advice was and how wise was the Government of

the day to take it has been demonstrated by the course of events in other countries. British shipowners were encouraged to buy the Government ships, including those which had been transferred to this country from Germany as one of the forms of reparation, and undoubtedly owners bid for many of the vessels in the belief that their duty lay in helping the Government to rid itself of the ownership of tonnage. With a return to peaceful conditions and with the setting in of a long period of trade depression values fell heavily, and the loss, instead of being incurred by the Government, was suffered by owners. Still, they had at least the satisfaction of knowing that they had helped to remove from this country the danger of the State ownership and control of tonnage.

War Effort of the United States.

The same course was not followed abroad. The outstanding example of the State ownership of shipping to which the War gave a great impetus was that of the United States. The great effort which that nation made to build ships when they were needed was extraordinarily fine. It was comparable with the amazing efforts made by the Allied and Associated Nations to produce the manufactures that were needed to carry on the War, and if the shipbuilding effort of the United States had been treated, as it began by being, as a War effort it would have ranked as a splendid achievement and would not have caused the dislocation in the commerce of the world which it has undoubtedly produced. The magnitude of the expansion may be recalled by the quotation of a few figures.

From July 1, 1917 (the year in which the United States entered the War), the Government-owned fleet increased from a total of 19 vessels, of 76,160 tons gross, to 1,798 vessels, of 7,993,771 tons gross, on July 1, 1921. Never before had such a thousand-fold expansion within the course of three years been witnessed. Unfortunately for the shipping of the world, the building programme of the United States did not stop with the Armistice. In fact, at that time, new shipyards which had been constructed were only beginning to produce results, and at the end of the War the United States was building far more tonnage than at any time during the progress of hostilities. Since then the policy has gradually been to restrict the ownership of State shipping by sales to private owners and by the breaking up of many vessels which, although they would have been useful for a short term of service during the crisis, were quite unfitted for trading in ordinary circumstances. The shipping which was not adapted for ordinary trading included a large amount of wooden tonnage. Sales during the last few years have been assisted by the offer by the Government of very easy terms of purchase and by large subsidies in the guise of mail payments. By September 1, 1931, the Government-owned fleet had been reduced to 390 vessels, of 2,214,974 tons gross.

As to the financing of the State-owned shipping, the total expenditure from the inception of the policy of Government ownership in 1917 down to July 1, 1930, was $3,615,208,259, or about

£723,000,000. On July 30, 1930, the appraised value of the fleet, which consisted of 397 vessels, of 2,239,153 tons gross, was $77,244,818—in round figures £15,500,000. During the year ended June 30, 1930, the operating loss was $11,043,625, or about £2,250,000. The net value of the total assets, including the item mentioned above as the value of the fleet, amounted on June 30, 1930, to $262,506,150, so that the net loss to that date was $3,352,702,108, or more than £670,000,000. The net annual loss gradually declined to $11,000,000 for the year ended June 30, 1930, while the State ownership fell from nearly 8,000,000 tons gross in June, 1921, to 2,250,000 tons gross in July, 1930.

Experience in Canada.

A decline in operating losses, in conjunction with a decline in the tonnage owned, also represented the experience of the Canadian Government Merchant Marine, Limited. In evidence given before the Select Standing Committee of the Dominion of the House of Commons on Railways and Shipping on June 25 last, Mr. R. B. Teakle, the Vice-President of the Canadian National Steamships, stated that in 1928 the operating loss was $1,209,083; in 1929 it was $878,907; and in 1930 it was $834,210. In 1929, when the loss was $878,907, the number of ships operated was 35, and in 1930, when the loss was $834,210, the number of ships was 26, and Mr. Hanson, a member of the Committee, pointed out that without question the ratio of the operating deficit had increased. On the other hand, Sir Henry Thornton, the President of Canadian National Railways, remarked that the fewer the ships the less the loss. This brought a retort that the fewer the ships the greater the loss for each ship or for each voyage, and Dr. Manion, a member of the Committee, added that if the ships were wiped out the loss would also be wiped out.

The evidence given before the Committee showed how handicapped a Government must be in the control of shipping in times of peace. Having almost unlimited funds at its command, it is in a position to pay well for the men it employs, and it should, therefore, be able to command brains. At the same time, highly trained officials who have spent many years in the service of shipping companies cannot be expected to surrender their posts and give up the prospects of promotion in order to join the service of a Government, unless they are fairly assured of the soundness and continuance of the Government schemes.

In his evidence Sir Henry Thornton declared that the vessels of the Canadian Government fleet were becoming less and less efficient for competitive purposes, because newer and more modern types of vessels were appearing—motorships and oil burners. There had been the same progress in marine engineering as in other branches of engineering, and each year the Government-owned vessels were placed in a more disadvantageous competitive position than in the previous year, because newer, faster, more economical, and more efficient vessels were being built and were engaging in transport.

The management had, Sir Henry Thornton said, been able to do practically nothing with the Government merchant marine fleet, which stood at that time at just about what it was when it was built, less depreciation. There had been a very material advance in the efficiency of ocean transport since the War, and against that the management had had to struggle with quite inadequate weapons. In reply to a question Sir Henry added that he thought they should " either go into the merchant marine business with effective weapons or get out of it. To go on as they were then doing was folly."

Progress or Decline.

Shipping strikingly illustrates the truth that a business cannot stand still. It must either progress or decline. The management of a Government fleet is not in a position to hold its own in highly competitive days. To do so it must be prepared to fight its competitors keenly, and that is not the function of a Government. Indeed, by keenly competing against the fleets of its own nation it would be destroying their earnings, from the taxation of which and of other industrial enterprises it looks for its own financial sustenance. The operation of State-owned shipping in competition with ordinary merchant fleets is also definitely harmful, because, however good the intentions, it cannot be entirely divorced from politics. For instance, the management of a State-owned line may be convinced that rates of freight on certain commodities are unremunerative and should be increased, but political considerations may prevent the putting of the rates on a proper basis. Consequently, services are rendered at a loss—not only by the State line, with the taxpayers meeting the cost, but also by ordinary ownerships, which may be compelled to follow the State line for the preservation of their connections. Thus, general losses on transport are incurred, to the detriment of the national revenue. There is no confidence, and owners hesitate to build or to improve their services at additional cost and risk.

As the result of its investigations the Dominions Select Standing Committee on Railways and Shipping duly reported that, in its belief, the time had come when the Government should very carefully consider the abandonment of the Canadian Government Merchant Marine and the making of arrangements with other shipping companies so that the external trade of Canada would not be jeopardised. In this respect it pointed out that the total original cost of the enterprise, which was undertaken solely as a result of the exigencies of the War, was approximately $80,000,000. After almost ten years of operation there had not been a single year in which an operating profit had been shown by the Merchant Marine. Throughout the whole period a deficit of over $57,000,000 had accumulated, including depreciation on ships sold and interest due to the Government, but excluding accrued depreciation on vessels remaining in the fleet, which depreciation amounted to more than $17,000,000. The exact total of the deficit on the working of the

Canadian Government Merchant Marine on December 31, 1930, was $57,640,001, or about £11,500,000. In addition, there was a total deficit in respect of the Canadian National (West Indies) Steamships, Limited, and subsidiary companies of $2,480,552, or nearly £5,000,000, so that the total loss of the Canadian Government on State-owned shipping to the end of that year was over £16,000,000.

Costly Australian Venture.

The venture of the Australian Commonwealth in Government shipping also resulted in a loss of many millions sterling. It had its origin in the purchase in 1916 by Mr. W. M. Hughes, who was then Prime Minister of Australia, of a fleet of 15 British cargo vessels. Many more were bought or built, until the total expenditure reached £14,888,000. On a re-organisation of the management in 1923 the fleet was valued at £4,718,000, and the sale of certain vessels realised £623,000, so that the depreciation of the fleet down to 1923 amounted to £9,547,000. Afterwards many vessels were sold until the fleet was reduced to seven big ships, which were transferred at the beginning of 1928 to the White Star and Aberdeen Lines, and became part of what is now known as the Aberdeen Commonwealth Line. From September, 1923, down to the end of March, 1927, the total loss on working was £1,918,000, and a reasonable figure for the total cost of the shipping venture to Australia is £11,000,000.

The decision to dispose of the Australian Commonwealth Line was very much a case of better late than never. The general rule in the Australian route has been for the tonnage in the outward trade greatly to exceed the demand for it, but never has the excess been so immense as during the last year or two. Because of the need of Australia to economise, imports have been prohibited or subjected to high duties, with the result that very little cargo has been available for the ships which have had to be dispatched to load cargoes of Australian produce, including wool, meat, and dairy commodities. Consequently, many vessels have had to be sent out on the long voyage in ballast, while in order to try to minimise the losses by rationalising sailings a number of vessels have been withdrawn from service for considerable periods. Serious losses have thus been incurred by the shipping companies, and had the vessels been maintained in the Australian Commonwealth Line of the Federal Government the losses in that service must have been much greater in consequence of the higher level of expenses of vessels on the Australian register. These losses the Commonwealth Government has been spared through the sale of the ships. The buyers had to remit payment for them, and the position became so difficult that last autumn a postponement of an instalment of capital was agreed to by the Federal Government. Just as the Imperial Government was able, when the ships were sold after the War, to transfer to ordinary owners losses which occurred through a fall in the values of tonnage, so the Commonwealth Government was able to transfer to British owners the heavy responsibilities involved in continuing the ships in service.

The abandonment of the Australian Commonwealth venture was quickly followed by improvements in services. Confidence which had been lacking was restored. Owners felt justified in fitting their ships with mechanical improvements which increased the speed. Australia benefited notably, and she will feel the advantages to a greater extent when her economic recovery enables better use to be made of all the available shipping.

Inclusion in the Socialist Programme.

In spite of all the disastrous experience with State ownership of shipping abroad, Socialist candidates at the General Election in Great Britain actually included in their addresses and in the programme of the Party, if elected, the assumption by the Government of the control of the shipping of the country, which was to be "reorganised" under public ownership. In one of the addresses a candidate undertook, as a first step towards social ownership and control of all the means of life, to do everything possible to hasten the transfer of the basic industries of the country, including transport, from private hands to public ownership and control. As has been recorded, experience in State ownership where it has been tried has resulted in very heavy losses for the Government concerned—further examples could be given—and the suggested transfer of shipping from private ownership to State control was scarcely a measure calculated to help the country out of its financial difficulties. Although the actual profit earned by British shipowners last year must have been very small, the total earnings of British shipping, representing invisible exports, cannot have been a negligible sum. In good years the earnings have been substantial. Happily, the electorate showed a great deal more sense than the candidates who proposed fantastic schemes involving vast Government expenditure, and the decisive vote given should mean that, for some years at any rate, any proposals for Great Britain to embark on the State ownership or control of shipping will remain far outside practical politics.

Cuthbert Maughan.

CHAPTER XII.

The American Merchant Marine.

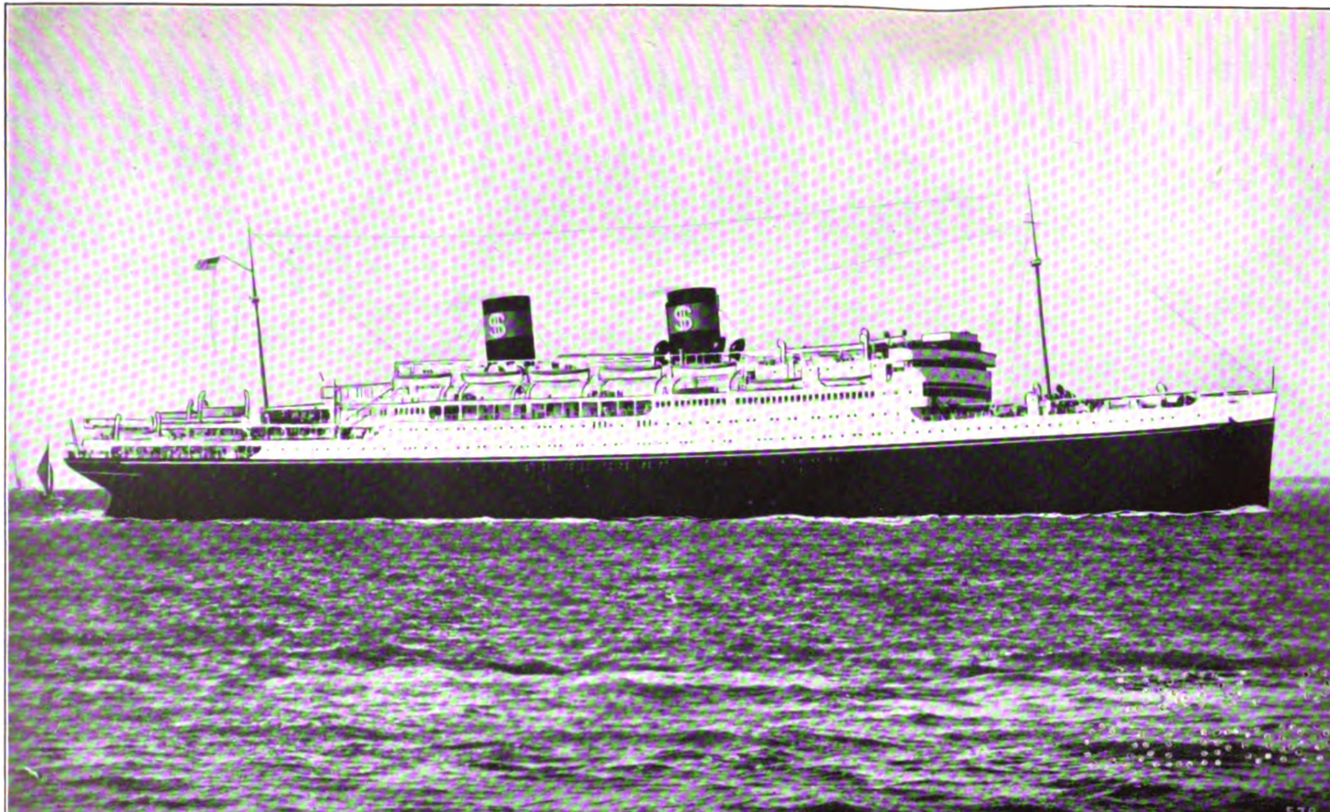
The ships built and otherwise acquired by the United States Government as a result of its War-time activities numbered 2,500, of nearly 10,500,000 gross tons. From the standpoint of numbers and tonnage it was the second largest merchant fleet in the world. From a competitive standpoint it was not so impressive. It constituted a conglomeration of vessels which obviously lacked modern facilities to meet the requirements essential for post-War competition. The problem which confronted the United States was what use could be made of this unbalanced fleet of ships.

For the two years following the signing of the Armistice there was a great demand for tonnage, and all available ships were carrying cargoes at profitable rates. This period of shipping activity, however, was of brief duration, and in 1921–1922 about 12,000,000 gross tons of shipping, representing about 20 per cent. of the world's sea-going steam tonnage, was laid up. About this time it became clearly apparent that ocean transportation was destined for a material change by the rapid transition from tramp to regular liner services.

Countries which were not a factor in pre-War days had to be reckoned with in the readjustment of shipping services. Germany's merchant marine, which after the War was reduced to a negligible tonnage, was coming back strong. Keen competition among the maritime nations was indicated. Each country was seeking to regain and strengthen its former position, recognising the importance of a strong merchant marine as a vital factor in competing for world trade.

Traffic favoured the ships with higher speeds. The need for modern ships to engage in liner services with increased speeds and special facilities to meet the requirements of the particular service soon became evident. Despite the huge tonnage laid up, new ships were ordered by the principal maritime countries, and in the period 1922–1928, 1,556 ships of 2,000 gross tons and over, aggregating 9,800,000 gross tons, were built. During this time not one ship was built in the United States for use in its overseas foreign carrying trade.

Shortly after the passage of the Merchant Marine Act of 1920, the United States Shipping Board made a comprehensive study to determine what steamship lines were desirable for the development, promotion, and expansion of the foreign trade of the United States. The result of this study was the establishment of 38 lines operated by the Board through private American steamship companies under agency agreements.



DOLLAR TURBO-ELECTRIC LINER PRESIDENT HOOVER.

(Builders, Newport News Shipbuilding Company.)

With a view to the permanent establishment of an American Merchant Marine, the Committee on Commerce of the Senate and the Committee on Merchant Marine and Fisheries of the House made a thorough survey of the shipping situation, terminating in the Jones-White Bill, which became law on May 22, 1928. Since the passage of this law modern ships are being built, mail routes are being established, and the efforts put forth during the past ten years toward the building of an adequate privately-owned merchant marine for permanent operation are materialising.

The American Merchant Marine in 1930 comprised 25,000 vessels, aggregating 16,000,000 gross tons, and was made up of 6,100 steam vessels of 12,800,000 gross tons, 12,000 motor vessels of 1,000,000 tons, and 6,900 sailing and unrigged vessels of 2,200,000 tons. The operation of this fleet required the employment of 203,000 men. A segregation by sizes shows that the total fleet contained 14,000 vessels of less than 100 gross tons; 8,100 vessels between 100 and 1,000 tons; 800 vessels between 1,000 and 2,000 tons, and 2,100 vessels of 2,000 gross tons and over.

The merchant fleet of the United States ranks next to that of Great Britain, and, in the class of sea-going steam and motor vessels (excluding vessels on the Great Lakes) of 2,000 tons and over includes 1,604 of 9,186,000 gross tons, as against 3,054 of 18,312,000 gross tons owned by Great Britain. Japan ranks next in number with 635 vessels of 3,172,000 tons in this class, followed by Norway with 585 of 2,910,000 tons, Germany with 575 of 3,319,000 tons, France with 548 of 2,908,000 tons, Italy with 537 of 2,887,000 tons, and the Netherlands with 477 of 2,636,000 tons.

Water-borne Foreign Trade.

The United States water-borne foreign trade is separated into three general classes—Overseas, Near-by Ocean, and Great Lakes. By "Overseas" is meant trade to destinations transatlantic, transpacific, and east and west coasts of South America; by "Near-by Ocean" that to Atlantic Canada, Pacific Canada, Mexico, Central America, the north coast of South America, and Caribbean region; and by "Great Lakes" traffic conducted on those waters with Canada.

In 1930 nearly 5,000 vessels of 24,000,000 gross tons of 30 countries participated in the foreign commerce of the United States. Of this huge fleet, 4,320 ships of 22,000,000 tons were engaged in the overseas and near-by ocean-borne foreign trade, and 607 vessels of 2,000,000 gross tons in the Great Lakes foreign trade. In the ocean trades, 1,334 American vessels of 6,200,000 tons were employed, and 2,986 foreign vessels of 15,800,000 tons, representing 29 foreign countries, participated in these trades.

Vessels engaged in foreign trade transported 104,700,000 tons of cargo, making at American ports 30,000 entrances bringing in 49,800,000 tons of cargo, and 30,000 clearances carrying out 54,900,000 tons. Vessels in the overseas trade made 15,800, or 62 per cent., of the total number of entrances and clearances during

the fiscal year 1930; and carried 55,252,000 tons of cargo, or nearly 53 per cent. of the total freight transported. Vessels in near-by ocean trades made 25,900 entrances and clearances, or about 44 per cent. of the total number; and carried 33,527,000 tons of freight, or 32 per cent. of the total cargo tonnage moved. Great Lakes vessels made 18,300 entrances and clearances, or about 30 per cent. of the recorded total; and carried 15,921,000 tons of freight, or about 15 per cent. of the total water-borne trade of the year. American-flag vessels made 25,000 entrances and clearances, or 41 per cent. of the total number of entrances and clearances; and carried 42,100,000 tons, or 40 per cent. of the total amount of freight transported. The remainder of the entrances and clearances, numbering 35,000, were made by vessels of 29 foreign countries, which carried 62,600,000 tons of freight.

In 1930 the total water-borne foreign commerce of the United States was divided into 70 per cent. dry cargo tonnage and 30 per cent. tanker tonnage. In the overseas trades dry cargoes constituted 77 per cent. of the total tonnage moved, and tanker tonnage 23 per cent. In the near-by foreign trade, which includes the territories from which we received large crude oil imports, tankers carried 56 per cent. of the total, and 44 per cent. was dry cargo. In the Great Lakes trades nearly 99 per cent. of the tonnage moved was dry cargo, and only a little more than 1 per cent. was carried in tankers.

Types of Ships in Foreign Trade.

Vessels engaged in carrying the foreign trade of the United States are segregated into four general types—Combination passenger and freighters; freighters; tankers; and miscellaneous, including sailers and unrigged vessels.

Combination passenger and freighters include all vessels with accommodation for more than 16 passengers. Vessels of this type made 32 per cent. of the entrances and clearances during 1930, and carried 8,163,000 tons, or 8 per cent. of the total freight moved. In the overseas trade vessels of this type made nearly 21 per cent. of the entrances and clearances, and carried nearly 11 per cent. of the cargo moved; in the near-by ocean trades they made 33 per cent. of the entrances and clearances, and carried about 7 per cent. of the cargo; and in the Great Lakes trade they made 40 per cent. of the entrances and clearances, and carried less than 1 per cent. of the cargo.

Freighters made 50 per cent. of the total number of entrances and clearances in 1930, and carried 63,284,000 tons of freight, or more than 60 per cent. of the total cargo movement. In overseas trades this type of vessel made nearly 61 per cent. of the entrances and clearances, and carried about 66 per cent. of the cargo; in near-by ocean trades they made 40 per cent. of the entrances and clearances, and carried 34 per cent. of the cargo; and in the Great Lakes trade they made 55 per cent. of the entrances and clearances, and carried nearly 95 per cent. of the volume.

Tankers made 12 per cent. of the total entrances and clearances,

and carried 31,704,000 tons of cargo, or more than 30 per cent. of the total water-borne foreign freight traffic of the year. Tankers made 18 per cent. of the entrances and clearances in overseas trade, and carried 23 per cent. of the cargo tonnage moved. In near-by ocean trades they made 16 per cent. of the entrances and clearances, and carried 56 per cent. of the cargo moved in those trades, and in the Great Lakes trade they made less than 1 per cent. of the entrances and clearances, carrying about 1 per cent. of the Great Lakes cargo tonnage.

Miscellaneous vessels engaged in the foreign trade of the United States made about 6 per cent. of the total entrances and clearances in 1930, and carried 1,549,000 tons of freight, or less than 2 per cent. of the total movement. In the overseas trade miscellaneous vessels carried less than 100,000 tons of cargo. In the near-by ocean trade miscellaneous craft made about 11 per cent. of the entrances and clearances, and carried 900,000 tons, or 3 per cent. of the near-by traffic, and in the Great Lakes trade they made about 4 per cent. of the entrances and clearances, and carried 550,000 tons of freight, or about 3 per cent. of the total Great Lakes movement.

As the result of the establishment of American lines in essential trade routes, the operations of the American Merchant Marine in the foreign trade of the United States have expanded until now 82 lines are operating 700 vessels of nearly 4,000,000 tons in services reaching all parts of the world. American lines have sailings from 16 Atlantic coast ports, 18 Gulf ports, and 29 Pacific ports, with termini in practically every important foreign and non-contiguous United States territorial port in the world.

New Construction.

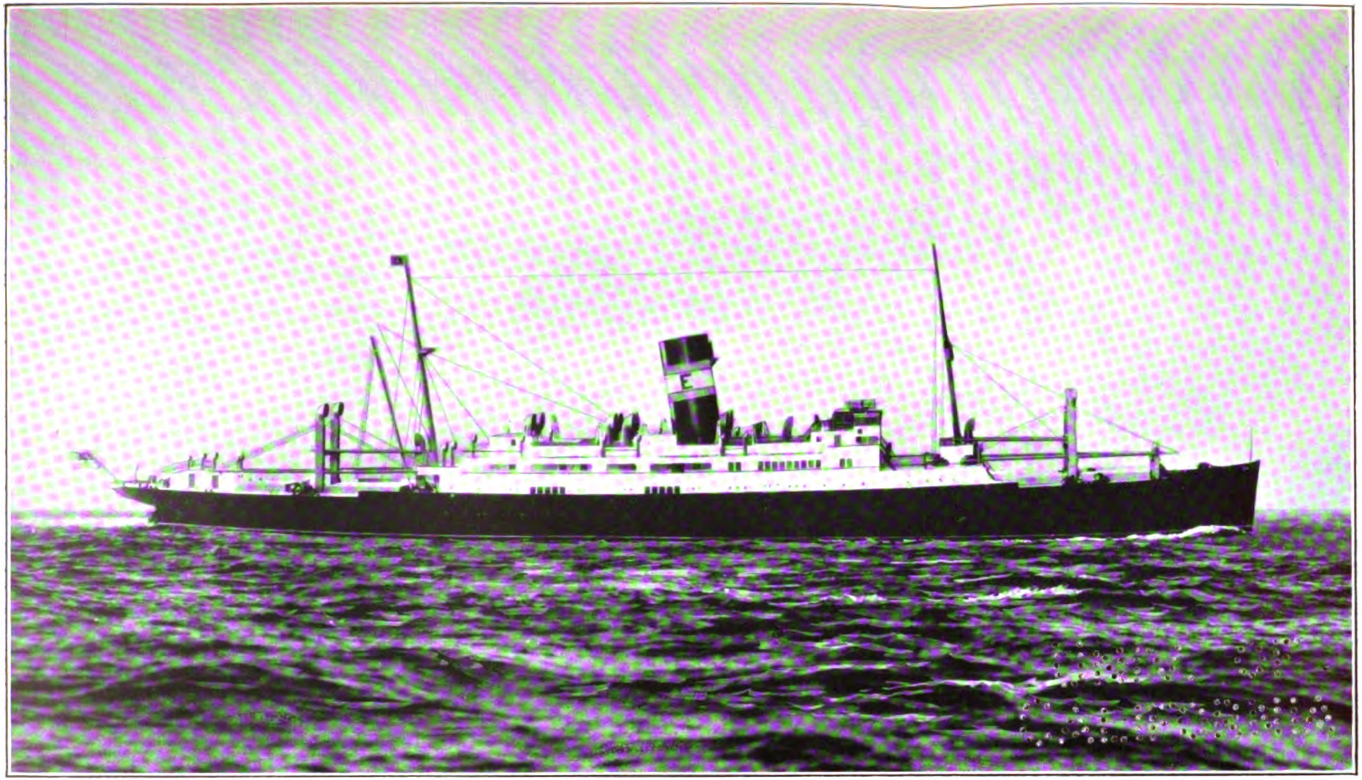
Experience in developing routes and services has demonstrated the need for modern ships to meet present-day demands for fast, regular, and dependable transportation services. The recognition of this need was what prompted the Congress of the United States to pass the so-called Jones-White Bill. Under this legislation 44 contracts have been made for the carriage of United States foreign mails with American companies. Of the 44 mail routes established, 21 operate from Atlantic coast ports, 7 from Gulf of Mexico ports, and 16 from Pacific coast ports. These mail contracts provide for a construction programme as well as for the reconstruction and modernisation of existing tonnage. The completion of this programme will result in the addition of approximately 70 modern vessels to the American merchant fleet during a period of ten years.

Since the passage of this law 41 vessels, aggregating nearly 500,000 gross tons, have been contracted for. Of this number, 19 have been completed and 22 are under construction. In addition, orders have been placed for the reconstruction and modernisation of 19 vessels of 157,000 gross tons. Thirteen of these have been completed.

The 41 vessels now under construction, or completed, include:—Two vessels of 30,500 gross tons each, now being built by the New York Shipbuilding Company, Camden, New Jersey, for the United

States Lines, Inc., for transatlantic service between New York and ports in Great Britain, France, and Germany; two vessels of 23,000 gross tons each for the Dollar Steamship Company, built by the Newport News Shipbuilding and Dry Dock Company, Newport News, Virginia, for service between New York, Cuba, Panama Canal Zone, California and transpacific ports in China, Japan, and the Far East; one vessel of 20,526 gross tons for the American Line Steamship Corporation, built by the Newport News Shipbuilding and Dry Dock Company, for service between New York, Cuba, Canal Zone, and California; three vessels of 18,500 gross tons each for the Oceanic Steamship Corporation, building at the Fore River plant of the Bethlehem Shipbuilding Corporation at Quincy, Massachusetts, for transpacific service between San Francisco and ports in Pacific islands and Australia; two vessels of 11,520 gross tons each for the Atlantic, Gulf, and West Indies Steamship Lines, built at the Newport News Shipbuilding and Dry Dock Company, for service between Atlantic coast ports and Caribbean ports; two vessels of 11,000 gross tons each, building at the Federal Shipbuilding and Dry Dock Company, Kearney, New Jersey, and one vessel of 9,640 gross tons for the Grace Steamship Company, built by the New York Shipbuilding Company, for service between Atlantic and Pacific coast ports and the west coast of South America; two vessels of 11,000 gross tons each for the Panama Mail Steamship Company, building at the Federal Shipbuilding and Dry Dock Company, for service between Atlantic and Pacific coast ports and ports in Mexico, Central America, and northern South America; four vessels of 9,359 gross tons each, built by the New York Shipbuilding Company for the Export Steamship Corporation, for service between north Atlantic ports and ports in the Mediterranean and Black Sea; one vessel of 8,272 gross tons for the American–South African Line, built at the Sun Shipbuilding and Dry Dock Company, Chester, Pennsylvania, for service between north Atlantic ports, West African ports, and South America; six vessels of 7,500 gross tons each, three building at the Newport News Shipbuilding and Dry Dock Company, and three at the Fore River plant of the Bethlehem Shipbuilding Corporation, for the United Fruit Company, for service between Atlantic and Pacific coast ports and the West Indies and Central America; one vessel of 7,114 gross tons for the New York and Porto Rico Steamship Company, built at the Fore River plant of the Bethlehem Shipbuilding Corporation, for service between Atlantic and Gulf ports and the Caribbean Sea; two vessels of 5,500 gross tons each for the Eastern Steamship Lines, Inc., building at the Newport News Shipbuilding and Dry Dock Company, for service between north Atlantic ports and Canada; and two tankers of 13,450 deadweight tons each for the Tidewater Associated Transport Corporation, built by the Sun Shipbuilding and Dry Dock Company, and ten tankers of 13,400 deadweight tons each for the Motor Tankship Corporation, building by the same company.

This review of what properly may be termed the pioneering period indicates that American shipping lines are gaining a firm position in the foreign carrying trade of the United States. This



AMERICAN EXPORT STEAMSHIP CORPORATION'S EXCALIBUR.
(Builders, New York Shipbuilding Company.)

progress has been made notwithstanding the unfavourable conditions prevailing during that time, including a shrinkage in world trade, with consequent idleness of a substantial percentage of world tonnage, and the further fact that the United States fleet was composed almost entirely of War-built ships. Despite the keen competition of the more modern foreign tonnage, American vessels carried during the period 1921–1930 one-third in value and over 40 per cent. in volume of the water-borne foreign trade of the United States, which included over 900,000,000 tons of freight valued at $74,000,000,000. The passenger and freight revenue of that period totalled approximately $9,000,000,000. A significant fact is the advance in the proportion of the foreign traffic carried in American ships, which, in the ten-year period ending 1914, was only 10 per cent. of the total foreign trade. Of even greater significance is the expansion of the foreign trade in regions where American shipping services have been introduced for the first time.

The upbuilding of the American Merchant Marine has revived shipbuilding in American yards. In the building of ocean-going vessels, industry throughout the entire country has benefited. As a result of the development and maintenance of an American Merchant Marine, employment both afloat and ashore has increased.

Training of Personnel.

Coincident with the expansion of the American Merchant Marine, attention has been directed to the training of personnel. Very definite progress has been made toward the attainment of a high standard of efficiency. The means already adopted and contemplated ensure further improvement in the future.

Among the American systems for training of deck and engineer officers is the State Schoolship System, which teaches the fundamentals in the marine field. Many of the shipping companies have inaugurated training systems of their own, which are proving highly effective. A number of the larger shipbuilding plants have introduced apprenticeship schools. Several plants building marine machinery have established training systems to develop men having a practical and scientific knowledge of the design, construction, and operation of ship power plants. Quite a number of American educational institutions are offering courses helpful in the proper training of men who expect to follow the shipping business both afloat and ashore.

The United States Naval Academy serves as a nucleus from which to draw an excellent grade of material for the merchant marine service. A number of former Naval Academy graduates are now serving as officers in American ships, while others are occupying positions among the various shipping organisations.

Losses and Subsidies.

Attention has been directed to the losses sustained and the subsidies provided to maintain an American Merchant Marine. As

to the so-called losses during the pioneering period, they were no more than were to be expected in the process of establishing a new business in a highly competitive field. The United States has benefited, directly and indirectly, by possessing its own merchant marine, and the far-reaching advantages to the nation, as a whole, have more than offset the investment required to maintain it during the pioneering period.

Concerning Government aid, the United States has introduced nothing novel, as for generations other maritime nations have extended aid to their shipping. The purpose of the United States in rendering aid to its shipping is to offset the higher costs of building and operating ships under American standards. In return for this assistance the Government requires of American shipowners the maintenance of essential services with fixed schedules over a period of years, with suitable types of ships and provisions for replacement, all of which ensure permanency of operations. The aid furnished to American shipowners is in accord with a sound economic policy, enabling the United States to possess a merchant fleet essential to the promotion of its foreign commerce, to check excessive ocean freight rates, to protect against interruptions in service, to retain a fair proportion of the revenue derived from its vast carrying trade, and to contribute to its political standing and serve in the national defence. This policy is in keeping with that voiced by the American people through their Congress.

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CHAPTER XIII.

THE CUNARD LINE.

THE fourth of July next will mark the ninety-second anniversary of the sailing of the Cunarder Britannia, the vessel which inaugurated regular steamship services between Europe and America. Throughout the eventful years which have passed since that historic event, the line of which she was the pioneer has consistently kept pace with the onward march of naval architecture and marine engineering, and to-day, in spite of intense rivalry, past and present, is justly regarded with national pride as one of the world's greatest shipping organisations. Though its history is an oft-told tale it will bear brief repetition, for in the record of progress, punctuated by good times and bad, and achieved in the face of a competition which has been quiescent only at rare intervals, there may be some suggestion of encouragement applicable to the depressed conditions against which British shipping and its affiliated industries are struggling to-day. It is certainly not without significance that at a critical time like the present the Company should have decided the occasion was opportune for building a super-ship over 20,000 tons bigger than the largest vessel under their flag, and sixteen times the aggregate tonnage of the four steamships which constituted the pioneer fleet. A more striking example of a lively faith in the future it would be difficult to imagine, but it is one which is quite in keeping with a traditional policy which, as past records show, has been abundantly justified.

THE FOUNDERS OF THE LINE.

Though the line, since it dropped its original formal title of "The British and North American Royal Mail Steam Packet Company," has borne the honoured name of Cunard, it is sometimes overlooked that its foundation and early progress were really due to the joint effort of an illustrious trio—Samuel Cunard, George Burns, and David MacIver. The first-named came of a Quaker family, who being Royalists migrated from Philadelphia to Halifax, Nova Scotia, where Samuel Cunard was born in 1788. Steam as a motive power for ships attracted him strongly, and as early as 1830 he was convinced of the practicability of regular "Ocean Lines," which would traverse the "level sea" without the assistance of metal rails as on the "uneven land." In 1838 the Atlantic crossings of the Sirius and Great Western further fired his imagination, and when the British Admiralty invited tenders for a regular mail service between England and America he realised that his oppor-

tunity had arrived. As the requisite capital was not procurable in Halifax he went to London, where the Secretary of the East India Company, whose agent he was in Nova Scotia, put him into touch with Robert Napier, the eminent Clyde shipbuilder and engineer, who in turn established contact with Burns and MacIver, the former of whom was mainly instrumental in arranging the financing of the project, the capital required being £270,000. In due course the tender was submitted and accepted, the co-partnery contract to convey H.M. mails once a fortnight between Liverpool, Halifax, and Boston being signed by Cunard, Burns, and MacIver. Thus was established the Cunard Line. The ships were built by Napier, and the first of the four, the Britannia, a wooden paddle steamer of 1,154 tons gross and 740 indicated horse-power, fitted with accommodation for 115 cabin passengers, and having capacity for 225 tons of cargo, sailed from the Mersey on Friday, July 4, 1840. Striking evidence of Cunard's acute instinct for appealing to the imagination of the public is shown in his choice of American Independence Day, even though it was a Friday, for the dispatch of the first vessel. She arrived at Boston in 14 days 8 hours—4 hours less than her estimated time—and such was the enthusiasm evinced that Cunard, who was a passenger, is reported to have received 1873 dinner invitations during his 24 hours' stay in the port.

Of the triumvirate who shaped the destinies of the line in its early days, George Burns was perhaps the outstanding genius. Shrewd and far-seeing, and tactful withal, he had established a successful coastwise service, concerning which it may be mentioned incidentally that the steamers engaged in the Glasgow-Liverpool service carried chaplains. David MacIver, who was then a business competitor, organised an opposition service, but his rival, though he held the strong hand, considerately proposed an agreement and the two became firm friends. The Burns' watchword was "safety and comfort," but safety first, and this slogan was rigorously applied to the Cunard ships, no expense being spared to ensure the best of hulls, engines, and equipment with thoroughly efficient personnel. Such a policy, carried out as it was to the minutest detail, may have reduced profits, but proved an asset of inestimable value. Burns held, too, that every addition to the fleet should show a marked superiority over its predecessors, but he was very conservative in the matter of new inventions and theories, maintaining in accordance with his motto of safety first that these should first be tried out in actual service before being incorporated in Cunard vessels.

That these methods were successful is evident from the report of the Select Committee which was appointed in 1853 to inquire into the question of ocean mail services. This placed on record that

"The Cunard Line of packets has of late years had to contend against serious foreign competition. We find that the vessels employed in the Line are much more powerful, and of course more costly than is required by the terms of the contract, and that as regards their fitness for war purposes, they are reported by the Committee of Naval and Military Officers as being capable of being made more efficient substitutes for men-of-war than any of the other vessels under contract for the packet service. The service has been performed with great regularity, speed, and certainty, the average length of passage, Liverpool to New York, being 12 days 1 hour 14 minutes."

When the arrangements for carrying out the contract were completed, and the organisation was in working order, Cunard made London his headquarters; Burns remained in Glasgow, while MacIver superintended the operations of the ships and the business of the line at Liverpool. MacIver died in 1845, and his mantle fell upon his brother Charles, an able administrator and a stern disciplinarian, under whose guidance the undertaking steadily developed on the lines laid down by its original founders. George Burns retired in 1858, when he divided his holding in the line between his two sons, John and James Cleland Burns. In May, 1889, when he was 94 years of age, a baronetcy was conferred upon him "in recognition of the great benefits which your enterprise and administrative power have preserved to the commerce of the country," and in June of the following year he passed away.

Sir Samuel Cunard—he was made a baronet in 1859—died in 1865, and his interest in the line passed to his son Edward. As the original shareholders had been gradually bought out by the founders, the whole undertaking had become the property of the three families. Such was the position in 1878, when it was deemed advisable by the proprietors to register the concern under the Limited Liability Acts. The joint stock company then formed had a capital of £2,000,000, of which £1,200,000 was issued and taken by the family groups as part payment for the property and business transferred to the Company, but no shares were offered to the public. In 1880, however, a prospectus was issued announcing that "the growing wants of the Company's transatlantic trade demanded the acquisition of steamships of great size and power, involving a cost for construction which might best be met by a large public company." The balance of the capital was immediately subscribed, and with John Burns, afterwards the first Lord Inverclyde, as Chairman of an influential directorate, the Cunard Line entered upon its career as a public company. He remained Chairman until his death in 1901.

Strenuous Competition.

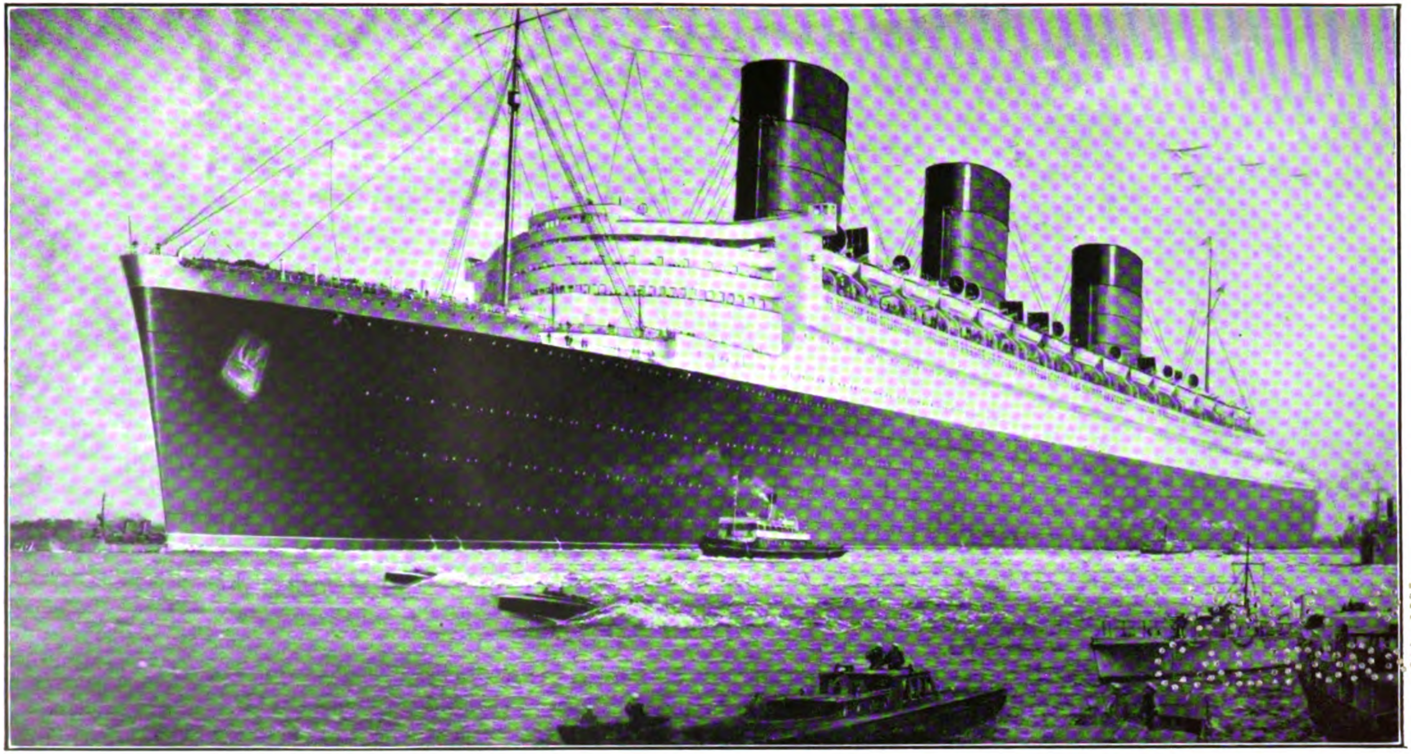
For the first decade of its existence the line enjoyed a practical monopoly, but in 1843 found it necessary to strengthen the fleet by two larger and speedier ships. By 1847 the demand for increased postal facilities had become insistent, and weekly instead of fortnightly sailings were arranged, the subsidy, or as George Burns preferred to call it, "freight paid for carriage of letters, that is for work done," being increased from £3,295 per voyage to £173,340 per annum. To comply with the terms of the revised contract four ships were built, each over 1,800 tons. They came into commission early in 1848, and in 1850 and 1852 were followed by three others, the largest of which was of 2,393 tons and 3,000 horse-power. She was the Arabia, the last of the wooden paddle steamers, and was credited with a speed of 13 knots.

Meanwhile vigorous opposition had been organised in the United States, where a strong section of the mercantile community warmly advocated the establishment of a rival service under the American

flag, especially as the British line had further wounded their *amour propre* by arranging to provide mail transport between Halifax and St. John's, Halifax and Bermuda, Bermuda and New York, and Bermuda and St. Thomas. The undertaking which entered into competition with the Cunard was the famous Collins Line, an organisation which had the generous support of the United States Government. Its ships were built regardless of expense, and excelled their rivals in size and luxury of accommodation and also in speed. With regard to the latter it was argued in Congress when the question of their subsidy was debated: "We must have speed, extraordinary speed, a speed with which the ships can overtake any vessel which they pursue and escape from any vessel they wish to avoid." It was in 1850 that the Collins Line entered the arena, and thus initiated that struggle for speed supremacy on the Atlantic which continues to-day, a contest in which the Cunard Company have been successful during 49 years of the 91 they have been in existence. Still, notwithstanding this determined effort to "sweep the Cunarders from the Atlantic," and the reduced revenue from passengers and cargo—the rate on fine goods was cut from £7 10*s*. 0*d*. to £4 per ton—the old Company pursued the even tenor of their way, confident in the high reputation they had established for safety, comfort, and reliable regularity. While carefully maturing their plans for a new ship for the Atlantic trade, they built a fleet of iron screw steamers for their new services to the Mediterranean and Black Sea ports, and between Liverpool and Havre.

The reply to the Collins' challenge came in 1856, when the iron paddle steamer Persia was commissioned. She made the homeward run from New York to Queenstown in 9 days 1 hour 45 minutes, a record which the Scotia of 3,871 tons, the finest paddle steamer ever constructed, reduced to 8 days 3 hours, and the Russia, a beautiful screw-driven creation of 2,960 tons, in 1867 to 28 minutes over 8 days. Meanwhile the fates had dealt unkindly with the Collins Line. One of their ships was sunk in collision off Cape Race in a dense fog, 268 lives being lost, and another disappeared with all on board. There were financial difficulties also, and in 1858, the year of George Burns' retirement, the company went out of business. Since then the Cunard has had many keen competitors, notably the Guion, Inman, National, White Star, Inman and International Norddeutscher Lloyd, and Hamburg Amerika Lines. All these at different times have owned an Atlantic record breaker, a distinction which is no barren honour, as experience shows its possession is a powerful drawing influence both for the ship and the line to which she belongs. There can be no question either that this rivalry has been a great incentive both to the naval architect and to the marine engineer, for the design and speed of a new vessel were frequently determined by the performance of the holder of the Blue Riband. In 1881 the Cunard Line achieved distinction in another direction, as its first steel ship, the Servia, 7,392 tons, was the largest and most powerful afloat, excepting the Great Eastern.

The first Chairman was firmly imbued with the wisdom of building in pairs. The sisters Umbria and Etruria of 1884–5, single-screw



THE NEW 73,000 TON CUNARD LINER.

[FROM A PICTURE.]

(Builders, Messrs. John Brown & Co., Clydebank.)

ships of over 7,710 tons, which made the crossing between Queenstown and New York in 5 days 22 hours 7 minutes and 5 days 20 hours 55 minutes, were described by the late Sir William Forwood, himself a Cunard director from 1887 to 1923, as the two most successful and popular ships ever owned by the Company. Their popularity was indeed remarkable, for it sometimes happened during the rush of American travel homewards they carried none but first-class passengers. The Campania and Lucania, twin-screws of 12,950 tons, which came out in 1893–4, were for some years the fastest vessels on the Atlantic, the former maintaining an average speed of 21·88 knots on her eastward runs during a whole year, and the latter 22·01 knots. Their records, however, went down before the onslaught of the Germans in 1897, and were not regained for 10 years.

A Critical Period.

The opening years of the present century marked a critical period in Cunard history. The line's ships were no longer the largest and fastest on the Atlantic, and its European business was seriously threatened by the efforts of the Germans to divert Continental traffic to their own ports and so feed their own ships. As a counter-stroke to the latter, it established the successful emigrant service between Trieste, Fiume, and New York. Those were the days, too, of the Morgan Combine, when American capitalists were seeking to obtain control of the cream of British North Atlantic shipping. Fortunately there was a sure hand at the Cunard helm in the person of the second Lord Inverclyde, grandson of George and son of John Burns, who was gifted with the family genius for steamship management in a superlative degree. He strenuously opposed the aggressive policy of Germany, and to counter the activities of the Morgan Combine succeeded in negotiating an agreement with the Government under which the latter were to finance to the extent of £2,600,000 the building of two large and fast steamers capable of making the Atlantic passage at a speed of 24½ knots in moderate weather—a knot faster than their German rivals. And so, with the enthusiastic approval of the nation, the Lusitania and Mauretania were ordered, the one from the Clyde and the other from the Tyne, an arrangement under which the patriotic emulation between these famous shipbuilding rivers ensured that each gave of its very best. The propulsion of the ships presented a serious problem, and when the expert committee appointed to investigate the question advised the steam turbine there were many who criticised the recommendation as a speculative proposal, on the ground that the efficiency of this type of prime mover had not been sufficiently tested in actual service. Turbines, however, were decided upon, and very wisely the Company determined to instal them in the 20,000-ton Carmania which was then building, and by this means much valuable experience was acquired. The Lusitania sailed from the Mersey on September 8, 1907, amid scenes of indescribable enthusiasm, and the Mauretania followed her in November. Neither ship had any difficulty in regaining the speed record, and they soon established themselves as first

favourites with Atlantic voyagers. Unfortunately the man whose bold policy had saved the Cunard Line to the nation and restored the speed record to the flag was not spared to witness the fruits of his patriotic work, and his death in 1905 was a serious loss both to the Company and to the nation.

The tragic fate of the Lusitania is a matter of history. Her sister, which held the Blue Riband until the advent of the Bremen and Europa in 1929, is still one of the world's wonder ships. She has averaged 25½ knots on 27 successive runs, and in reply to her latest competitors crossed to the westward at 27·48 knots and returned home at 27·65 knots. A truly marvellous ship!

War Work.

On the eve of the Great War the Cunard Company held a strong position on the Atlantic, their outstanding vessels being the palatial Aquitania of 45,647 tons, the record holders Lusitania and Mauretania, the popular Caronia and Carmania, and a pair of fine new ships, the Franconia and Laconia of 18,000 tons, which were subsequently replaced by others of the same names. All these vessels, together with the other units of the fleet, were, according to the agreement under which the Lusitania and Mauretania were built, at the disposal of the Admiralty in case of war, and when hostilities broke out the Aquitania and Caronia were immediately requisitioned for conversion into armed cruisers, the former sailing in her new rôle on August 8, 1914, and the Caronia two days later. The Carmania, which on the 7th of the same month arrived at Liverpool from New York with passengers and cargo, left the Mersey on the 15th fully equipped for patrol duty on the Atlantic, and on September 14 she fought her gallant action with the Cap Trafalgar, the latter vessel being sunk, though not before she had inflicted serious injury on her opponent. The dismantling of these vessels, entailing as it did the removal of much decorative work and its storage for future use, and the adaptation and equipment of the ships for their new mission in such a short time, was a high tribute to the energy and organisation of the Cunard Company, and was justly regarded as such by both the Government and the nation.

The career of the Aquitania as a commerce protector terminated after a serious collision in the Atlantic, but as a transport and hospital ship, services for which her great size admirably fitted her, she did invaluable work. Another unit of the fleet employed as a cruiser was the Laconia, which took part in the operations that resulted in the destruction of the German warship Königsberg on the coast of East Africa. After the Laconia had been returned to the Company and had resumed her place in the North Atlantic passenger service she was sunk by submarine. Many of the Cunard fleet were withdrawn from their normal schedules for trooping, among them being the Mauretania, which did great work in that capacity and also as a hospital ship. The Thracia, normally a Mediterranean trader, was commissioned for White Sea service, and while frozen-in resourcefully landed stores for the Russian army over the icefields.

As might be expected from the hazardous nature of these duties, and the risks to which the ships engaged in the North American and Mediterranean services were subjected, the losses were very heavy. They amounted in all to over 205,000 tons, and included the Lusitania, 32,500 tons, the Franconia and Laconia, both over 18,000 tons, and five others whose tonnage each exceeded 13,000 tons. These sacrifices in the national cause, however, were only indications of one phase of the wartime activities of the line. The whole of the Cunard organisation, with the directorate who determined its policy and the management and staffs that carried it into effect, was mobilised to win the War, and their patriotic endeavour will ever rank amongst the highest traditions of this historic undertaking. The wide experience of the directors was unreservedly placed at the call of the country. The Chairman, Sir Alfred Booth, among other onerous positions which he filled, was Chairman of the North Atlantic Committee under the Liner Requisitioning Scheme. Sir Thomas Royden, the Deputy Chairman, first assisted the Director of Transports in London, and was subsequently appointed a member of the Shipping Control Committee, out of which grew the Ministry of Shipping. On two occasions he proceeded to the United States and represented the Controller of Shipping at Washington. He was also a member of the Royal Commission on Wheat Supplies. On these bodies he took a leading part in maintaining the food supply of the nation, and in dealing with the many shipping problems which arose when the United States joined the Allies. Sir Ashley Sparks, another director, and also the New York agent of the company, represented the Minister of Shipping at Washington. Sir Percy Bates, the present Chairman, held an important position at the Admiralty as head of the new Commercial Branch of the Transport Department, and subsequently became Director of Commercial Services at the Ministry of Shipping. The late Sir Aubrey Brocklebank and Mr. Walter Tyser also held responsible administrative positions under that Ministry. The staffs ably supplemented this patriotic effort, though in so doing their energies were taxed to the utmost, for under the liner requisitioning scheme many vessels were diverted to the North Atlantic trade in order that the Allies might be adequately supplied with foodstuffs and munitions. These ships came under the control of the "Established Lines," and hence during the War the Cunard Company acted as agents for 400 steamers besides running their own. The work which devolved upon their officials was colossal, as during one year alone there were no fewer than 200 sailings from North American ports under Cunard management. During the War the line was responsible for the transportation of 900,000 officers and men, 7,300,000 tons of foodstuffs, munitions and general cargo from the U.S.A. and Canada to the United Kingdom, 1,000,000 tons in the reverse direction, 850,000 tons to Italy and the Mediterranean, and 400,000 tons between France and England. In addition to this enormous freightage, nine of their bigger ships were fitted to carry 2,000 tons of oil in their double bottoms for the replenishment of naval fuel stocks.

Ashore the record of achievement was equally meritorious. The

engineering works and repair shops at Liverpool, concentrating mainly on war work, overhauled the hulls and engines of two of H.M. ships and fitted two others as seaplane carriers, and also manufactured gear for mines and paravanes, gun beds and artillery wheels. A Cunard national shell factory employing an average of 1,000 hands, 80 to 90 per cent. of whom were women, was also established. Work went on night and day, and the total output of shells, ranging in size from 4 to 8 inches, was over 400,000. In 1916 the directors of the Company, realising the serious shortage of aeroplanes, arranged with the Government to erect and equip a factory for their manufacture at the expense of the latter. This was the largest aeroplane factory in the country, and turned out its first completed machine eight months after the cutting of the first sod. When handed over to the Controller of National Aircraft Factories, its output capacity was 100 machines a month. One other example of Cunard war work may be mentioned. This was the completion, in 1916, of the palatial edifice which, begun before the War, is the present headquarters of the line and forms an imposing feature of Liverpool's water-front.

Post-War Policy.

On the cessation of hostilities one of the pressing matters facing the Company was the replacement of war losses. The Chairman, Sir Alfred Booth, took an optimistic view of the situation, believing with many other leaders of the shipping industry that the restoration of peace would ensure a long era of profitable employment. Unfortunately, subsequent events have shown that serious difficulties were to retard world recovery, though there was little evidence of them during the hectic period of prosperity which marked the opening years of peace. The building programme decided upon was necessarily an ambitious one, in spite of the high cost of material and labour, for all that remained of the Cunard Atlantic fleet were the Aquitania, Mauretania, Caronia, Carmania, and Saxonia; the last of these, having been built in 1900 for the Boston trade, was of little practical use. The pressure, however, was relieved considerably when the Company acquired the Hamburg-built liner Berengaria, of 52,226 tons and a speed of 23½ knots, a vessel which has done excellent work since she was brought up to the Cunard standard. In 1921 the first of the new fleet was commissioned, the Scythia, of 20,000 tons and 17 knots, the first of six built for the passenger and cargo trade with the United States. Before the close of 1925 these were all in service, as also were a like number of ships of 14,000 tons and 15 knots' speed, built for the Company's Canadian Service. Thus by 1925 the wastage of the War had been repaired by the addition of 200,000 tons of specialised shipping built to cater for the present and prospective requirements of the American trade.

The present fleet of the Company consists of 20 steamers of 344,241 gross tons, four of which, aggregating 9,608 tons, are engaged in the Mediterranean freight service. These figures refer only to the original undertaking whose history is sketched above, and do not

include those of the lines which recent Cunard enterprise has brought into association with it. These are the Commonwealth and Dominion Line, 25 ships of 203,931 tons, trading between London, Liverpool, and Australasia; the Brocklebank Line, 28 ships of 210,409 tons engaged in the Eastern trade; and the Anchor Line, some of whose 9 ships of 111,148 tons maintain a passenger service between Glasgow and New York, while others run to India.

The fleets controlled by the Company and their associates thus number 82 ships of 869,729 tons. The merging of these interests is comparatively recent. The Commonwealth and Dominion Line was formed in 1914 to take over the Anglo-Australian Steam Navigation Company, the Tyser Line, etc., and in 1916 the Cunard acquired the whole of the capital. In 1912 it had become a large shareholder in the Anchor Line, which had a considerable interest in the Brocklebank undertaking, and in 1919 the balance of the shares was taken over. It further consolidated its position in 1921 by supplementing its holding of ordinary shares in Thos. & John Brocklebank by taking up the whole of the preference capital. In the current balance sheet these shares in subsidiary companies at cost, less amounts written off and reserves, stand at £6,727,538.

The Present and the Future.

The present directorate of the Cunard is a strong one, the board consisting of Sir Percy E. Bates, Bart., G.B.E. (Chairman), Frederick Alan Bates and Herbert William Corry (Deputy Chairmen), Sir Alfred Booth, Bart. (Chairman from 1909 to 1922), Sir T. A. L. Brocklebank, Bart., A. C. F. Henderson (Manager), S. J. Lister (Manager), Maxwell H. Maxwell, C.B.E., Robert W. Reford, Sir Thos. Royden, Bart., C.H. (Chairman 1922 to 1930), Sir T. Ashley Sparks, K.B.E., and Walter P. Tyser. It will be seen that the Board are well qualified by practical experience to deal in the best way possible not only with the difficulties of North Atlantic business, but also with the trade problems of their associated lines.

Faced with the problem of a successor to the Mauretania, they have boldly decided to build at Clydebank a vessel which it is expected will be equally famous, and which is rapidly approaching the launching stage.* She will be over 1,000 ft. in length, and of 73,000 tons gross. Such building and service risks as cannot be absorbed by the insurance market will be taken over by the Government, and already the Clyde is being prepared for her launching and ultimate passage down the river, while a dry dock is being built for her reception at Southampton. That she will regain the Blue Riband of the Atlantic for Great Britain is confidently expected.

Richard Beynon.

* Work on the construction of this vessel was suspended on December 12.

CHAPTER XIV.

Bristol—Past and Present.

"Bristol, where ships anchor in the street." This picturesque description of the ancient port is not in any way overdrawn, for what first-time visitor to the Western metropolis has not halted and gazed with wonder at the storm-scarred hulls of vessels fresh from voyages to foreign lands disgorging their cargoes on to quays in the very heart of the City? Bristol truly can be said to have been nurtured upon the products of her maritime trade, and her present prosperity and comparative immunity from the trade fluctuations common to many other industrial centres can be directly attributed to the multiplicity of her centuries-long established industries, founded for the most part upon the pioneer efforts of her revered sons of the sea and the enterprise of her merchant princes.

From time immemorial Bristol has claimed the proud title of the Gateway of the West, and history justifies the claim. The origin of the City is lost in antiquity, but it is clear that the Phœnicians traded with the western shores of this island long before the Roman conquest, bringing salt, earthenware, and brazen vessels in exchange for tin and lead. The Avon appears to have been the terminal port and the mart for exchange with the Siluri or people of South Wales. The ensuing decline of Phœnician maritime power coincident with the Roman invasion put an end to this trade, but a revival followed as the power of Rome extended, and Bristol was constituted the main Roman outpost in the West.

Bristol prospered through the times of the early Saxon kings, to fall into decay with the Danish conquest of Wessex. For several centuries, however, following the accession of Alfred the Great, she flourished and was, next to London, the principal seaport of England. In A.D. 960 she contributed many ships and men towards the fleet raised by Egbert against the Danes. A charter, dated 1272, is still extant, in which Henry III granted Dublin to be inhabited by the men of Bristol who had long carried on a commerce with Ireland.

Edward III in 1347 raised a fleet for the siege of Calais, for which London provided 25 ships and 662 mariners, Bristol 22 ships and 608 mariners, and Weymouth 20 ships and 264 men. No other of the great ports of the present day found a place in the list. Another example of the relative importance of the cities of those distant days is found in a list dated 1378 of loans to the King. In this list London is shown as contributing £5,000, Bristol the odd amount of £666 13*s.* 4*d.*, and Salisbury £100. There exists a record that in 1332 Bristol had an extensive trade with Genoa, Spain, France,

ST. AUGUSTINE'S BRIDGE, BRISTOL.

Flanders, and Norway, the principal exports being grain, tin, and wool.

The great period of maritime adventure which began in the sixteenth century with the discovery of America found those great pioneers John and Sebastian Cabot, James Elliot, and Thomas Ashurst in the vanguard. They and the Bristol merchants were inured by generations of arduous and successful endeavour to play the part which has added lustre to the great traditions of the City. It is unnecessary to refer in detail to the controversy whether Columbus or the Cabots first actually discovered the mainland of America, but it is not generally known that Sebastian Cabot was chiefly instrumental in founding an extensive trade with Russia by virtue of voyages to Archangel under his auspices. The Cabots also laid the foundation of the West Indian trade, which records show was firmly established in 1526. Soon afterwards, largely by the enterprise of that great philanthropist, Edward Colston, the trade with Spain and Portugal was developed, with later extensions to the West Coast of Africa.

Thus in the eighteenth century we find three trades with different parts of the world mutually complementary and supporting each other. Wines from Spain and palm oil and slaves from Africa were brought to Bristol, where they were marketed and provided back loading for the ships which brought sugar from Jamaica and tobacco from Virginia. It seems clear that Bristol's comparative prosperity at this period was dependent upon her entrepôt trade—the exchange of commodities between those different parts of the world.

One aspect of Bristol's trade, apart from the mere shipping and unshipping of goods, demands attention. In those days inland communication was slow and costly, and so it came about that raw materials had to be worked up on the spot, and hence arose sugar refineries, soap works, cloth mills, pottery and glass manufactories, and other factories for the utilisation of imported and home-grown raw materials. The legislation of those days was very monopolistic. Outsiders were not allowed to trade, and to be a burgher or a freeman of Bristol carried with it many material advantages. These rich merchants seem to have combined with their monopoly a great local patriotism. They lived on their work, they established their factories under their own eyes, and they employed the native population. So Bristol waxed rich and grew in population upon a prosperity based almost entirely upon the ocean trade of her port.

The advent of the industrial revolution early in the nineteenth century marked the beginning of Bristol's decline from the proud position of second port and second most populous city in the kingdom. The invention of the steam engine and the discovery of coal in the northern counties resulted in the migration of a large proportion of the population from Southern to Northern England. Some writers have attributed the decline of Bristol at this stage to the rise of Liverpool, but it may be said that the advance of Liverpool was the consequence, and not the cause, of the rapidly increasing population round it. It may also be said with equal truth that Bristol had the same advantages as Lancashire in available supplies

of coal in Somerset and South Wales, with a woollen trade long established, besides a well-developed shipping connection with American ports. Be that as it may, the decline was most probably due to the apathy of her captains of industry who, with wealth accumulated from trades built up by their progenitors, had settled into a groove. They seem to have failed to see the signs of the times, or to grasp the necessity of altering their methods before the trade had largely drifted from them. In the meantime their younger rivals in the North seized on and developed the new channels of trade. Some West Country readers may be inclined to view this trend of affairs with complacency, or even satisfaction, for the West Countryman may be forgiven for his pride in the silvan beauty of the Western shires. Here Nature has conspired to give the fertile hills and valleys of Somerset and Gloucester a wealth of loveliness scarcely equalled in these islands. There may be, therefore, consolation in the thought that the spoliation inseparable from industrialisation has left the West Country practically unscathed.

Works of Improvement.

It was doubtless the geographical position of the City that first led trade to concentrate on Bristol. It is also probable that the ford of the Severn estuary at Aust was the scene of the earliest trade relations between the Roman and the Cymri, which later moved to the more secure location afforded by Bristol six miles up the tortuous River Avon. Here a certain immunity from the ravages of pirates and sea robbers was obtained. The harbour of those far-off times was mainly as Nature made it, and it is clear that for centuries vessels took the ground with each receding tide, without suffering harm or undue inconvenience. As the science of shipbuilding advanced, however, it became imperative that some improvement on Nature's handiwork should be provided.

The first notice we find of any artificial work was in 1239, and between that date and 1247 the St. Augustine Trench was constructed. This comprised a diversion of the River Frome, and provided a deep water channel for the ships and a quay at which they could lie. It was nearly half a mile long and cost £5,000, a formidable sum in those days.

For the next five centuries there exists no record of any important constructional changes. In 1712 a dock was begun at Sea Mills, half-way to the mouth of the Avon, at the outfall of the River Trym. It was the third wet dock constructed in England, and is believed to have been for the accommodation of the whaling fleet which was a regular feature of the trade of those days. It was not a commercial success and was eventually abandoned.

The first floating dock is heard of in 1762, when the Merchants' Dock was fitted with lock gates to impound the water, but apart from this the port for some years remained a tidal one. It became apparent in the second half of the eighteenth century, as it did over one hundred years later, that bold action was necessary if the port

was to retain its pride of place. The design of ships was altering, and they could no longer take the ground without damage. There was also serious risk of fire with ships immovable at low tide. Henceforward many schemes for the provision of floating docks were propounded, each to be rejected until at long last, in 1803, an Act was obtained constituting the Bristol Dock Company with a capital of £250,000, increased by subsequent Acts to £580,000. The approved plan provided for the diversion of the River Avon to a new cut from Netham to Rownham. Dams were constructed across the river at Totterdown, near Rownham, and at Netham. Between Totterdown and Netham a straight cut was made, saving three-fifths of a mile. This cut, known as Feeder Canal, enables small craft from above Netham to enter the Floating Harbour at Totterdown, besides supplying the Harbour with water to compensate for loss by leakage or in the use of locks, etc.

On the new course of the river, midway between Totterdown and Rownham, Bathurst Basin was made. The principal entrance was formed lower down at Rownham, with entrance locks 189 ft. long by 45 ft. wide and a basin, now known as Cumberland Basin, 700 ft. long by 300 ft. wide connected with the Floating Harbour by means of a junction lock. These works were completed in 1809.

The increase in the size of ships gave rise to further extensions of locks in 1839 to the design of Isambard K. Brunel, the great engineer. The lock dimensions were now 262 ft. long by 54 ft. wide, but in 1865 the necessity again arose and the locks were enlarged to 350 ft. long by 62 ft. wide. At the same time various improvements to the river enabled ships with a maximum length of 240 ft. to navigate it on favourable tide conditions. This probably marks the limit to which, at economic expenditure, the approaches to the City Docks can be improved. About the same date the rails of the Great Western Railway were extended to the docks.

History repeated itself, and in the latter part of the nineteenth century the City found itself in danger of losing its commerce from the continuing growth of vessels too large to ascend the river. Was the needed accommodation to be provided in the river or in entirely new docks outside the river? It would need very much more than the space available to describe even briefly the controversy which raged for forty years between the "dockisers" and the opposite party. The "dockisers" produced successive schemes by eminent engineers to dam the Avon at its mouth or at some intermediate point, and their opponents favoured the construction of docks entered direct from the Bristol Channel.

The practical result of the long delay occasioned by these differences of opinion was that two independent companies were formed for constructing docks at the mouth of the river, one on the Gloucestershire side by the Avonmouth Dock Company and the other by a competing company at Portishead. The Avonmouth Dock was opened in 1877 and that at Portishead two years later. When these two companies commenced business the dockisation controversy was still raging, and it continued after both river-mouth docks were acquired by the Corporation in 1884.

Finally the Corporation decided to abandon the idea of dockisation and concentrated on the development of Avonmouth. The Council in 1901 approved a scheme drawn up by Sir J. Wolfe Barry and Sir Benjamin Baker, and Parliamentary powers were obtained. On March 5, 1902, the first sod was cut by the present King (then Prince of Wales), and on July 9, 1908, the Royal Edward Dock was declared open by King Edward. The latest development is the extension of the Eastern Arm, opened by the Prince of Wales on May 23, 1928, an addition to the port's already considerable accommodation which is chiefly remarkable for the elaborate facilities provided for the reception and rapid distribution of grain cargoes. Indeed it may be said that Bristol has completely reversed the disability of unpreparedness from which she suffered for so many years, and is now equipped, on the most up-to-date lines, somewhat in advance of the immediate needs of the port.

Administration.

The history of the administration of the Port of Bristol differs from that of any other port in the country, for while other ports have mostly undergone a devolution from corporate ownership to private enterprise, Bristol alone after lengthy trials of both systems has reverted to the earlier, and remains to this day under the fostering care of the citizens.

A charter granted by King John in 1190, which seems to have succeeded earlier ones, conferred the right to burgesses to traffic in the commodities which formed the trade of those days. This was repeated in many subsequent patents and grants. The ground for St. Augustine's Trench, already mentioned as being the first artificial work, was purchased by the City from the Abbot of St. Augustine. There are records in the reigns of Henry III and the first two Edwards of grants enabling the City authorities to collect tolls on ships. The first authority to collect dues on goods was granted by Edward III. In the first year of his reign Edward IV granted the right to levy tolls in perpetuity to the Mayor and Commonalty of Bristol. In 1500 Henry VII appointed Thomas Hoskins to be Water Bailiff for life, and granted to the Mayor and Commonalty to appoint his successors on payment of four marks a year to the King. The holder of this picturesque office, which is still retained, was, until after the constitution of the Dock Company, the chief officer of the Corporation in control of shipping. The charges levied on trade from about that time were collected under the heads of Anchorage Dues, Moorage Dues, Mayor Dues on ships, and Wharfage Rates on goods. These dues are now absorbed in the single port due on ships and goods, but a dissection is still made at the Docks Office, and the proportions based on the old schedules are paid over to the City Treasurer for credit of the general revenues of the City.

What might appear to many to have been an anomalous position was the disposal by the Corporation of these perpetual powers to the Society of Merchant Venturers for a nominal payment of £10 a year.

EASTERN ARM, ROYAL EDWARD DOCK, AVONMOUTH.

Much bitter criticism was excited in the years that followed by what was termed the exploitation of the City by the Merchant Venturers, but the real facts appear to be that the Merchants Societies and the City Authorities were identical, and the Merchants Guild was the department of the town administration whose duty was to maintain and regulate the trade monopoly. During the sixteenth and seventeenth centuries various long-term leases were granted by the Corporation to the Society of Merchant Venturers, which conferred upon them the right to collect dues on shipping, they in turn being responsible for the provision and maintenance of the quays. The Society's last lease was surrendered in 1861. It was this leasehold possession which gave the Merchants Society an equal interest with the Corporation itself when agitation resulted in the establishment of the Bristol Dock Company in 1803, and under the Act of that year the Board of Directors consisted of nine members of the Corporation, nine members of the Merchants Society, and nine representatives of the shareholders. The Act preserved all rights of the Corporation, and provided a schedule of charges on ships and goods to be payable to the Company, with a sinking fund which should eventually redeem the capital, when the whole concern reverted to the Corporation. The division of interests in this peculiarly constituted Board led to recriminations, and disaster was the result of divided management. It was left to the Corporation in 1848 to obtain Parliamentary powers to acquire all interest in the Company on the terms of paying the shareholders 2⅝ per cent. on their stock. Finally, in 1883, the Dock Company was dissolved.

While the City was discussing various policies for the improvement of the port's facilities, the private companies which had constructed docks at Avonmouth and Portishead, as already explained, were taking a growing proportion of the total trade, and the ensuing rate-cutting war between the separate interests culminated in 1884, when both companies were bought out by the Corporation. From then until 1900 the dockisation controversy effectually held up extensions, the need for which was recognised by all parties. In 1900 the Corporation agreed upon a policy of extension at Avonmouth, and the Royal Edward Dock was constructed. It is inevitable in view of the tendency of shipbuilding that Avonmouth should take an increasing proportion of the trade of the port, but that does not mean that the trade of the City Docks has declined. On the contrary there has been a steady increase of tonnage. The City Docks deal principally with the coasting and short sea trades, while the ocean trade is mostly accommodated at the river-mouth.

Trade and Future Development.

It must be apparent to all careful students of transport problems that Bristol owes her almost unrivalled distributive power to her geographical position. Within a radius of one hundred miles is a population of over 10 millions, or one-fifth of the population of Great Britain. Would it be aiming too high if the port made its objective the reception and distribution of one-fifth of the import

trade of all foodstuffs of the country? To exemplify the potentialities of Bristol it is only necessary to refer to one aspect of the current trade of the port, i.e. the importation of bananas. Of this popular fruit the port handled in 1930 the enormous total of close on six million stems, comprising over 50 per cent. of the total imports to the United Kingdom. These were distributed to an area far beyond the confines of the actual local market, and is sufficient testimony to illustrate the point.

The port has handled annually grain to the aggregate of one million tons, and in 1930 received and distributed nearly three-quarters of a million tons of petroleum and its products. Other items contributing to a vast and increasing volume of merchandise include timber, green fruit (364,609 boxes in 1930), provisions, tobacco (27,840 tons), refrigerated produce, cocoa, wines and spirits, besides a variety of raw materials to feed the varied industries located in the City and its environs.

The Port Authority, again, is conscious of the need of assisting to the fullest possible extent the creation of new industries within the borders of the City. Its policy has taken practical shape by the addition of some three hundred acres of land to the dock estate. This vast acreage, with all the advantages of dockside proximity, is known as the Chittening Estate, and is already equipped with some excellent factory buildings which are readily adaptable to individual needs. Herein lies a great opportunity for manufacturers who pay proper regard to the importance of ready access to sea routes with the attendant advantages of cheap reception of raw materials and conveyance of manufactured articles. These advantages are further strengthened by the geographical position of the port, situated as it is far up the Severn Estuary.

Notwithstanding the already great trade which the port enjoys the Port Authority is fully alive to the need of still further trade expansion, and in enlarging and equipping the docks in the manner described it has evinced an optimism which compels admiration. Bristol has definitely commenced the long climb back to her former eminence, and her inherent merit as a trading centre, recognised long centuries ago, still remains her greatest asset. The task confronting those responsible for the port's destiny is formidable, having in mind the present acute competition amongst the great ports, but one may feel assured that every possible channel is being explored by which its trade connections can be further encouraged and strengthened.

For the future who can prophesy? One can at least feel satisfied that the old spirit of enterprise which imbued the great pioneers of bygone days still actuates their modern counterparts. The inspiration of those noble endeavours comes echoing down the corridors of time and bids them go forward with a good courage.

EDWARD M. DYER,
Chairman, Port of Bristol Authority.

CHAPTER XV.

Training of Cadets for the Merchant Navy.

In studying the question of the training of cadets for the merchant service it is first necessary to review the qualities that are essential in the officers of a merchant ship. These may be set down as sound physique, high character, good education, ability to shoulder responsibility and take command, resourcefulness, courage, both mental and physical, high sense of duty, loyalty to Sovereign and superior officers, and, to be a successful sailor, an inherent love of the sea. As a rule most of these qualities are possessed by British boys who have been well brought up, but in many cases they require to be developed by an efficient system of education and training.

A generation ago, when square-rigged ships sailed the Seven Seas, the means of training apprentices were comparatively simple. Youths were quickly initiated into seamanlike ways, having to steer and to hand and reef sails on their first voyage, and subsequently taking a prominent part in the working and handling of the ship. until seamanship in all its phases became part of their everyday life. In many ships the captain taught them navigation in the cabin at sea in the second dog-watch, whilst in harbour, if the ship was anchored in a roadstead, the apprentices usually manned the gig, and thus received a sound training in boat work. No observant youth took long to pick up the seaman's craft. With occasional help from those over him, he became a proficient junior officer after four years of such training. Very often the senior apprentice, after three years' service, was made third mate, and thus at an early age acquired authority and responsibility, while his training and experience made him resourceful.

It cannot be gainsaid that the average cargo vessel of to-day, whether steam or motor, does not offer the same facilities as the square-rigged ship of yesterday for training a youth in sea lore or bringing out the qualities enumerated above. If this view is accepted it becomes necessary to adopt a different type of training if the merchant service is to be supplied with highly-skilled and efficient navigating officers. It is therefore suggested that sea-going, State-aided training ships should be established, operated by a committee consisting of shipowners, ship masters, one or more underwriters, and representatives of the Government, and supported by grants from the Board of Education, shipowners' organisations, Lloyd's, the Honourable Company of Master Mariners, the Officers (Merchant Navy) Federation, and other organisations interested. The importance of sea-going training ships is exemplified by the value placed

on such ships by the majority of the maritime nations. Denmark, France, United States of America, Soviet Russia, Greece, Yugoslavia, Sweden, Spain, Italy, Argentine, Belgium, Germany, Chile, Finland, Japan, Norway, Sweden, Poland, and Portugal, each has its sea-going training ships, whereas Great Britain has none.

The youth who has decided on a sea career in the merchant service should be entered at the age of 15 to 16 years. If his parents can afford it, and he is so disposed, he would be well advised to begin his training in one of the cadet training establishments, H.M.S. Worcester, H.M.S. Conway, or Pangbourne Nautical College, where his general education will be continued on public school lines with a nautical atmosphere. In such cases the cadet should commence at the age of 15, two years' service in any of the above establishments being accepted by the Board of Trade as one year's sea service for the Second Mate's Examination. For boys whose parents or guardians cannot afford the fees (£120 to £160 a year) required by these institutions, cadet training schools are maintained at ports in the United Kingdom, such as Leith, Hull, Glasgow, and Cardiff, where excellent training is given in the elements of seamanship, navigation, and nautical astronomy under Board of Trade approval. Training in these schools counts as half sea time up to a maximum of six months. In London, at the L.C.C. School of Engineering and Navigation, the fees for cadets before going to sea are only £1 a term, or 10*s.* a month for boys who wish to take only a short course. At the Boulevard Nautical School, Hull, the fees are about £5–£7 a year, and are somewhat similar at schools at other ports. These nautical schools receive assistance from the Board of Education.

Sea-going Training Ships.

Following on such education, cadets should be drafted to sea-going training ships. These ships should not be of great size. Vessels of the barquentine type, of about 600 to 700 tons net register, fitted with auxiliary power, either steam or motor, and with accommodation for some 30 to 50 cadets, are suggested. It is not essential that these ships should be square-rigged, though the barquentine rig would be very suitable, but sail power should be the normal motive power. Ability to furl a royal or stow a flying jib is not a qualification necessary to the modern ship's officer, but it is an accomplishment in which the right type of boy revels, and to be taught it at sea is an excellent training in smartness, method, and nerve control.

Three of these sea-going training ships would form a sufficient nucleus, and their number could be added to as necessity might demand. They should be constructed to carry cargo, and might trade on short voyages overseas to the Mediterranean, West Indies, or the Baltic, as well as round the British coasts. The carrying of cargo is considered necessary, as the important subject of stowage of cargo should be thoroughly ingrained in the youthful sailor's mind. It must be emphasised that success in carrying and delivering cargoes in first-class condition is of primary importance to the shipowner and underwriter, as well as to the officers of the

ship. Further, stowage of cargo is closely allied to the stability of a vessel, and these two subjects are second in importance only to navigation and seamanship.

The training ships would be fitted with wireless telegraphy, in which instruction would be given, and providing financial considerations permit, they should be equipped with the latest aids to navigation, such as wireless direction finder, Kelvin sounding machine, and echo sounder, in the operation of which the cadets should receive instruction and pass out.

Period and Character of Instruction.

In the case of those who have served two years in the Conway or Worcester, or at Pangbourne, twelve months would be served in one of the sea-going training ships, this latter time to count in full. For cadets who have served twelve months or over at a junior technical school in one of the sea ports eighteen months' service in the sea-going training ship would be requisite. Boys who have not had the advantage of training in a harbour cadet ship would be required to pass the Board of Trade eyesight test and a medical examination to ensure their physical fitness, and also to sit for a competitive entry examination before being appointed at the age of 16 years, and they would then complete a two years' course in a sea-going training ship. In all cases there would follow two years as cadet or apprentice in a merchant ship, which would qualify for the Second Mate's Examination.

The advantages of training in a comparatively small vessel, specially designed and officered for the purpose, are manifest, compared with the present method of apprenticeship in a modern cargo steamer. To begin with, the early training of youths in a small vessel under sail brings them in close contact with the elements. They acquire that sea lore which is fascinating as well as instructive to youth, learning to judge the direction of the wind and the sea, and to understand the weather and the reasons for its changes. Above all, they acquire courage and resourcefulness.

Boat work would play an important part in such a system of training, and the training ship should be equipped with pulling and sailing boats and a motor launch. The need for instruction and training in the handling of boats under oars and sails in rough weather cannot be too strongly emphasised. The value of a knowledge of boatwork was fully demonstrated by that epic of the sea, the saving of the crew of the Trevessa. After the vessel foundered in the southern part of the Indian Ocean, the ship's boats were navigated a distance of 2,000 miles to Rodriguez Island and Mauritius by the skill of the captain and chief officer.

The vessel should be officered and manned approximately with a captain, three navigating officers, one engineer officer, one schoolmaster, one boatswain, one carpenter, one donkeyman, four to six able seamen, stewards, cook, and cook's boy. The captain should be specially selected for his ability to supervise the efficient training

of cadets, quite apart and in addition to his capability as a commander. The officers should likewise be specially selected, and would be employed in teaching the cadets navigation, seamanship, stowage and handling of cargo, ship construction, etc. In addition to the ship's officers, of whom there should be at least three, a schoolmaster or naval instructor should be carried to take charge of the cadets' general studies, which should not be allowed to cease immediately they join the ship, as is so often the case to-day in the apprentice's life, necessitating a period of school training at a nautical college before they can sit for the Second Mate's Examination. An engineer officer would also be carried, who would give the cadets a course of training in engine-room routine and overhaul, to which would be added boiler-room work if the vessel is equipped with an auxiliary steam engine.

Knotting and splicing would be taught by the boatswain, and cadets would be "told off" in turn to work with the carpenter and donkeyman to acquire knowledge in those trades.

An important branch of training for the sea service which has been much neglected in the past is that of "handling a ship." It is suggested that the captain of the training ship should take the cadets in hand and teach them how to handle the ship both under sail and under power, and particularly under steam or motor power on entering and leaving harbour. Unfortunately, in the average merchant ship neither cadet nor officer gets much opportunity of learning to handle a ship, except during his period of service as third officer, and then only by close observation. Under the present system in the merchant service, when the ship is going into and out of harbour the chief officer is stationed on the fo'c'sle head and the second officer aft, so that these officers have little opportunity of acquiring experience in the handling of a ship. When they attain command they realise their shortcomings in this respect. If the elements of ship handling are taught and explained to cadets early in their career, they will constantly apply the knowledge acquired to the handling of their vessels throughout their experience as officers.

The fees for the cadets' training should not be too high, as the training ship cannot be expected to run at a profit. A fee of £50 to £60 a year, payable quarterly, would be reasonable. In the case of cadets serving two years, £40 for the second year should be sufficient. It would then be possible for a parent to give a boy a sound nautical training in a training ship to equip him as an officer in the merchant service for the expenditure of approximately £100. If the scheme suggested is regarded as too expensive for the parents of the average merchant service apprentice or cadet, it is suggested (and this is one advantage of having several small ships) that the sea-going training ships might be graded, the Government grant being increased in the case of a ship where it is felt desirable to reduce the training fees.

When the cadets have completed two years' training in a sea-going training ship (or eighteen months in the case of those from a port training school, and one year in the case of Conway, Worcester, or Pangbourne cadets), and on being appointed or apprenticed to a

JAPANESE TRAINING SHIP KAIWO MARU
(AUXILIARY DIESEL ENGINES ARE FITTED.)

ORKNEY AND SHETLAND STEAM NAVIGATION CO.'S ST. SUNNIVA.
(*Builders, Messrs. Hall, Russell & Co., Aberdeen.*)

shipping company, some approved system should be adopted to conform with the training already received, and to develop that training with experience of practical conditions in the merchant service. This might be done by the adoption of some generally accepted system of training by all shipping companies, which could best be arranged through the medium of the Shipping Federation. Several large shipping companies have their own schemes of training cadets, such as Messrs. Alfred Holt & Co., the New Zealand Shipping Company, the British India S.N. Company, and the British Tanker Company. The valuable knowledge and experience gained by these companies could be made use of through a representative council appointed by the Shipping Federation.

It would obviously be a retrograde step for youths who have received two to three years' specialised training to be sent to sea in a modern cargo steamer simply to carry out daily routine work with the men; the training already acquired should be applied to the practical experiences of everyday sea life. The conditions that obtain in many ships of the merchant service, in which cadets and apprentices are brought up as junior seamen working with the deck hands instead of being trained or imbued with the idea of becoming officers and taking charge of men, are derogatory to good discipline. There are many difficulties to be overcome in the tramp steamer with a small crew, but they are not insurmountable.

It is suggested as worthy of consideration that arrangements might be made by the committee of management to give selected cadets a three or six months' course in a shipbuilding yard in order that they might acquire some knowledge of ship construction. It would be for the Board of Trade to decide whether time so spent could be fairly counted towards the sea service qualification.

Such a system of training as has been proposed could be expanded as circumstances might demand. It would supply the British merchant service with highly trained officers, confident in their ability to take charge of any modern vessel, and would, it is submitted. be of inestimable advantage to the shipowner, the underwriter, the officer, and the travelling public. Most important of all, it would be of lasting benefit to the British nation.

Much useful spade work has been done by the Sea Lion Sail Training Ship Society under the chairmanship of Sir Wm. Garthwaite, Bt., the owner of the last square-rigged British sailing ship, now unfortunately lost. The object of this society is to bring into being a deepwater sea-going training ship, and untiring efforts are being made to keep this project before the British public and to secure the interest of British Government Departments such as the Board of Trade and the Board of Education. The writer feels, however, that he must join issue with the society's proposal to establish one square-rigged sailing ship (without auxiliary power) at a cost of approximately £50,000 for a new ship, or £10,000 for a second-hand one. She would carry a comparatively small number of cadets on voyages to and from Australia; in fact, she would merely revive the old type of sailing ship which was forced out of existence by economic factors. The scheme could never hope to train sufficient

junior officers for the merchant service of to-day. At its best it could produce only a few specially trained officers, who would doubtless be drafted to one or two liner companies. What is required is a more general scheme, preferably on a national basis, capable of producing officers suitable for all types of ships in the merchant service in sufficient number to meet the requirements.

In conclusion, the writer wishes to pay tribute to the valuable work performed by Devitt & Moore's Ocean Training Ships, Limited.* That company owned and operated the famous cadet training ships Hesperus, Harbinger, Macquarie, and later Port Jackson and Medway, in which vessels many of the present-day merchant service captains and officers received their early training. The last of these vessels, the Medway, came to an untimely end as a sail training ship, following the loss of the Port Jackson by torpedo attack. Much against the wishes of her owners, the Medway was acquired by the Ministry of Shipping in 1918, and converted into a hermaphrodite oil carrier, regardless of the future of her cadets, who had to quit her at short notice.

F. J. Thompson,
Captain, O.B.E., R.N.R. Ret., R.D., A.I.N.A.

* For many years also this company conducted the Nautical College at Pangbourne, but last year it was decided that it should give place to a new company, the Devitt and Moore Nautical College, Limited, the affairs of the college being administered by a governing body including, under Sir Philip Devitt's chairmanship, the members of the former consultative committee.

CHAPTER XVI.

The Costs of Ships.

From several points of view the building of a large vessel gives cause for wonder and admiration. The precision with which naval architects and marine engineers are able to satisfy the demands for carrying ability, for stability under all conditions, for adequate speed and limited fuel consumption, besides providing passenger accommodation to an exacting standard, appeals to the uninitiated as a very remarkable achievement. One aspect offers as great cause for comment as any mentioned, and that is the possibility of arriving at any reasonably close estimate of the ultimate cost of a first-class vessel of the largest type. When it is borne in mind that thousands of workmen of many different trades are employed in the building of such a ship, that thousands of tons of material of all kinds are incorporated in its structure, that equipment from the proverbial "needle to an anchor" is required for its completion, the immensity and complexity of the task of making an estimate with even a moderate degree of detail becomes apparent.

Notwithstanding the apparently insurmountable difficulties of arriving at a definite figure to form the basis for a contract this must be done, for owners are not anxious to enter into any agreements with builders to build on "time and lime" basis. Immediately after the War the labour market was so fluctuating that builders would not accept contracts at fixed prices, and agreements were entered into whereby owners were to pay for all material and labour chargeable to the particular vessels under construction, plus agreed rates of charges for the use of the yard plant and the services of the staff, and agreed rates of profit to the builders. In many cases the final costs were almost double those anticipated by the owners when the orders were placed, and the extensive building programmes entered into by several shipping companies under these terms of contract almost exhausted their resources. At the present time shipbuilders are so anxious to get work that they do not take exception to the great risks involved in entering into a contract, involving perhaps a million or two sterling, at a definite fixed price, and accordingly owners know before fixing up the work the actual capital outlay involved. With this knowledge estimates can be made by their accountants of the probable balance of receipts with the charges on the capital outlay and running expenses.

When the manufacture of standard articles is undertaken the cost can be ascertained with great accuracy and the selling price

determined accordingly. Ships, however, do not lend themselves to such methods of sale, for it is seldom that any group of vessels are constructed of the same particulars in all respects. Nevertheless, ready methods have been used in connection with the hull and machinery costs of cargo ships, the hull costs being based on the amount of steel required for their construction and the machinery costs on the horse-power to be developed. Take, for instance, a steamer of 10,000 tons deadweight capacity with reciprocating machinery capable of developing 3,000 i.h.p. Such a vessel would require approximately 3,250 tons of steel for its construction. It is possible that an overall rate of £23 per ton would afford an approximation to the cost of the hull of a tramp steamer at the present time, which indicates a hull cost of £74,750. If the machinery be taken at £13 per i.h.p. the installation would cost £39,000, and the complete cost would be £113,750, or at the rate of £11·375 per ton deadweight. These figures are merely given as illustrating the method which may be employed, and are not presented as definite contract rates.

In a paper on "The most suitable sizes and speeds for general cargo steamers," read before the Institution of Naval Architects in 1918, Mr. John Anderson gave prices for steamers with reciprocating machinery. These ships were of 11 knots speed, and the costs are presumed to be those ruling in pre-War days, since the shipbuilding rates were very unstable in 1918 and few cargo ships were being built. The figures are given in Table I.

TABLE I.

Dimensions.			Deadweight.	I.H.P.	Cost.	Cost per ton deadweight.
Length.	Breadth.	Depth.	Tons.		£	£
250′	37′	18′ 6″	1,879	1,258	26,700	14·3
330′	45′	24′ 6″	4,591	1,935	44,700	9·7
410′	53′	30′ 5″	8,260	2,540	66,800	8·1
490′	61′	36′ 4″	13,126	3,230	104,900	8·0
570′	69′	42′ 3″	19,815	4,080	153,700	7·8

More recently some figures of costs were given by Mr. John McGovern in his paper, "Notes on the progress of transportation of oil by sea," to be found in the *Transactions* of the North-East Coast Institution of Engineers and Shipbuilders for 1929-30. These figures referred to oil tankers of 11 knots speed and are reproduced in Table II.

From these it is clear that in tankers the type of machinery installed has a marked influence on the initial cost. In the case of the 16,000 ton deadweight ship, the difference in cost between the steam-driven and Diesel-engined vessel is approximately £40,000. If it be assumed that the Diesel engines cost £25·5 per b.h.p. their cost would be £91,165, leaving for hull £120,650. Applying this hull cost to the corresponding vessel with reciprocating machinery it is found that the cost of the steam installation is £50,970 for 3,930 i.h.p.,

or practically £13 per h.p. Further, the difference between the displacement and deadweight is 6,000 tons; the machinery weight will be approximately 1,000 tons, leaving 5,000 tons for the hull, costing roughly £120,000, or £24 per ton.

TABLE II.

I. Steam tankers burning oil.

Dimensions.			Displacement.	I.H.P.	Deadweight.	Cost.	Cost per ton deadweight.
Length.	Breadth.	Draught.	Tons.		Tons.	£	£
430′	57′	25′ 6″	14,020	2,830	10,095	117,535	11·63
460′	61′ 3″	26′ 3″	16,700	3,150	12,110	135,487	11·17
490′	64 6″	27′	19,400	3,570	14,120	153,745	10·87
510′	67′ 9″	28′	22,130	3,930	16,135	171,620	10·63
530′	70′ 6″	29′	24,920	4,285	18,150	190,170	10·47
545′	71′ 10½″	30′ 6″	27,660	4,670	20,160	206,900	10·25

II. Diesel tankers.

Dimensions.			Displacement.	B.H.P.	Deadweight.	Cost.	Cost per ton deadweight.
Length.	Breadth.	Draught.	Tons.		Tons.	£	£
430′	57′	25′ 6″	14,020	2,575	10,000	148,520	14·85
460′	61′ 3″	26′ 3″	16,700	2,900	12,000	169,670	14·13
490′	64′ 6″	27′	19,400	3,250	14,000	191,180	13·65
510′	67′ 9″	28′	22,130	3,575	16,000	211,815	13·24
530′	70′ 6″	29′	24,920	3,900	18,000	232,985	12·94
545′	71′ 10½″	30′ 6″	27,660	4,250	20,000	252,375	12·62

The figures here given are to be taken as illustrative of the methods employed to arrive at some approximation to costs. With regard to Mr. McGovern's figures, they may be applicable to some particular types of oil tankers, but they appear to be less than has been paid comparatively recently for tanker tonnage. It is possible that the rates quoted above for Diesel-engined tankers could be applied to the steam vessels and the Diesel-engined ships correspondingly increased.

COST OF WARSHIPS.

Although cargo ships and oil tankers lend themselves to the methods indicated above other classes of vessels cannot be brought down to a convenient basis. Take for example the costs of warships. In the Navy Estimates the costs of vessels of various types are given, and some interesting comparisons can be drawn from the corresponding figures for the different classes of ships. As illustrations the costs of the battleship Nelson, the cruiser Suffolk, and the destroyer Active are compared in Table III.

TABLE III.

	Battleship Nelson.	Cruiser Suffolk.	Destroyer Active.
Length	660′	590′	312′
Breadth	106′	68′ 4″	32′ 3″
Draught at standard displacement	28′ 7″	16′ 3″	8′ 6″
Standard displacement . . . tons	33,500	10,000	1,330
Estimated horse-power	45,000	80,000	34,000
	£	£	£
Cost of hull fittings and equipment	2,790,000	739,000	99,000
,, propelling and other machinery	516,000	457,000	141,000
,, gun mountings, torpedo tubes, etc.	2,419,000	723,000	28,000
,, incidental charges	224,000	229,000	15,000
,, guns	460,000	61,000	8,400
Total cost	£6,409,000	£2,209,000	£291,400

Accepting the above values as the costs of the completed units the costs per ton of standard displacement become for the battleship £192, for the cruiser £221, and for the destroyer £219. These figures, however, are of no use in affording guidance to a contractor as to whether his tender is on a competitive basis, because the hull and machinery costs are involved with sundry dockyard charges which enter into the total costs of the ships.

It is interesting to note that the prices paid to the contractors for the propelling machinery were as follows :—

	S.H.P.	Cost.	Rate per s.h.p.
Battleship	45,000	£483,883	£10·7
Cruiser	80,000	£407,140	£5·1
Destroyer	34,000	£141,000	£4·1

COST OF LARGE PASSENGER SHIPS.

Several factors entering into the design of large passenger ships influence the costs, such as the standard and extent of the accommodation provided and the speed and power required, so that any figure for the cost must be regarded as very approximate indeed. Some idea may be arrived at, however, by assuming that the complete cost, including machinery, approximates to £45 per gross ton. That is, a vessel of 18,000 tons gross will cost £810,000. In his paper, "The propulsion of ships by modern steam machinery," read before the Institution of Naval Architects in 1929, Mr. J. Johnson gave the following costs of turbine installations :—

	Low-Pressure Steam Plant.		High-Pressure Steam Plant.	
S.H.P.	Cost.	Cost per s.h.p.	Cost.	Cost per s.h.p.
18,000	£266,000	£14·8	£256,000	£14·2
30,000	£408,000	£13·6	£390,000	£13
60,000	£735,000	£12·25	£690,000	£11·5

If it be assumed that the 18,000 tons gross ship costing £810,000 be fitted with machinery of 18,000 s.h.p. costing £260,000, this leaves £550,000 for the hull, or approximately £30 per ton gross.

Detail Methods.

While approximate methods may be useful in affording some idea as to the costs of ships, for the purposes of tendering for new construction an enormous amount of detail work is undertaken. It would be wellnigh impossible for an estimate to be made if records were not available of the actual costs of building previous ships of a similar kind. Cases are not uncommon of builders undertaking to construct vessels of a type to which they are unaccustomed and finding, to their ultimate discomfiture, that liner costs cannot be based on, say, tramp experience. The quality of the work, as regards both actual structural steel work and the standard of internal fittings, is so different that rates which hold for the tramp cannot give any guidance for high-class work.

The chief item of expenditure is that concerned with the actual steel structure, and except when the passenger accommodation is of a very extensive nature and of a very high character the cost of steel and its erection is a measure of the cost of the ship. It is of the utmost importance, therefore, that the estimate of the weight of steel required should be made with the greatest possible degree of accuracy. Ready methods of estimations are in use, the one generally applied being based on the cube number of the ship. The late Sir George Carter gave the following figures in his paper on "Standard cargo ships" (*Trans. Inst. N.A.*, 1918):—

Type.	Dimensions.	Net Steel.	Cube No. / 100.	Co-efficient.
		Tons.		
Raised quarter deck with poop, bridge, forecastle	285′ 6″ × 41′ 9″ × 21′ 2½″	1,110	2,550	·435
Single decker with poop, bridge, forecastle . .	331′ × 46′ 6″ × 25′ 6″	1,390	3,950	·351
Single decker with poop, bridge and forecastle .	400′ × 52′ × 31′	2,225	6,450	·345
Two decker with poop, bridge and forecastle .	376′ × 51′ 6″ × 29′	1,920	5,650	·340

It should be noted that the steel given in the foregoing is net steel, and that in order to arrive at the gross steel required about 15 per cent. should be added; this would have the effect of increasing the coefficients in the same ratio.

While the coefficient method may serve its purpose when the construction of cargo ships is concerned, in the case of other types of vessels the coefficient chosen must be based on the nearest type to that under consideration. It is usual, however, to employ the sectional method, which takes account of the separate items comprising the entire structure. Thus framing, shell, deck plating, beams, bulkheading, keelsons, erections, etc., are all estimated

separately, each section being compared with the type ship's data, and the gross total arrived at being compared on the cube number basis with that of the type ship.

Notwithstanding the greatest care in estimating, a margin is necessary to take account of the numerous smaller items which cannot be estimated in detail.

Main Castings.

It has been presumed that with the invitation to tender for a particular ship plans have been submitted to form the basis of a contract, and that a detailed specification has accompanied these plans. From these the type of ship, the standard of accommodation required, and the speed which the vessel must attain are made clear. It is the duty of estimators to study the information submitted and to note, in detail, the points which call for special consideration.

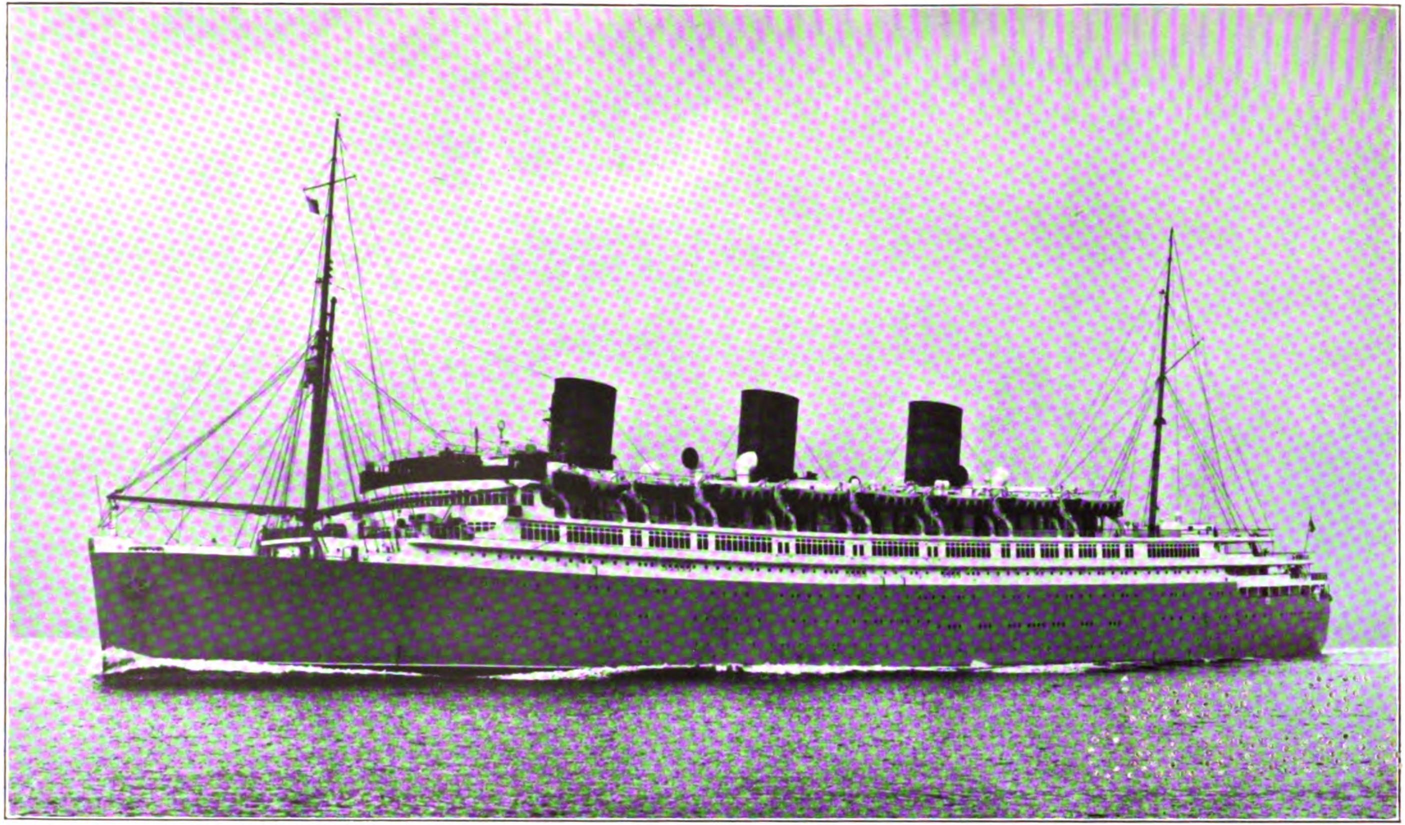
In order that the vessel may fulfil her functions properly there must be a harmonious arrangement of weights; that is, the weight of the hull added to that of the machinery and the deadweight to be carried must be such that the limiting draught will not be exceeded and yet the form be such as can be driven at the required speed with the least expenditure of power. It is necessary, therefore, to study the possibilities of the design and examine the propulsion problem in some detail. One point which must be determined is the probable size of the propellers, for the shaft brackets, which may form quite a large item in expenditure, are dependent on the size of screw adopted. Besides this question of propulsion the steering must be considered and the type of rudder determined, since the extent and cost of the large castings which form the sternpost and rudder depend on the result of this inquiry. In very large ships the castings for the rudder, the sternpost and the propeller brackets may cost as much as an ordinary coaster complete with machinery.

Rivets and Riveting.

Even in small ships the number of rivets required amounts to many thousands and in really large vessels to several millions. Fortunately, the number of tons required forms a fairly constant percentage of the gross weight of steel, and the estimator is able to arrive at the probable cost on this basis. This percentage works out at approximately five per cent. of the gross weight of steel, and this weight at the current rate for rivets gives the expected expenditure in this connection. The riveting forms one of the chief items of the wages in connection with the building of the steel structure, but account is taken of this in what is known as the iron worker's rate, almost half of which goes in riveters' wages.

Wood and Woodworkers.

In cargo ships wood and woodworkers' costs, while important items, do not influence the total cost to a very great extent, but in



FURNESS WITHY TURBO-ELECTRIC LINER MONARCH OF BERMUDA.

(Builders, Messrs. Vickers-Armstrongs, Newcastle-on-Tyne.)

passenger ships they form the main item of expenditure next to that of the steel structure. Under the heading of carpenters' timber the wood decks, hatch covers, sparring, ceiling, and probably launch ways, etc., are grouped. The joiners' wood takes account of all material required for the cabins for passengers, officers and crew, for all the stairways and ladderways, for the numerous wood fittings required for the galleys and pantries, for all the fitted storerooms, and for the doors, windscreens, lockers, racks, skylights, wood-houses, and shelters throughout the vessel.

Teak decks are commonly adopted in first-class passenger liners, especially in those engaged on tropical service. Pitch pine or Oregon pine may be used, but these woods do not have the qualities desirable. When cost is of primary consideration these timbers may be seriously considered, but for passenger promenading spaces teak is generally preferred. The cost of the wood for the decks and the selection and laying of the timber comprises the chief item in expenditure in connection with the carpenter work.

In the construction of ships a large section of the work is carried out by the carpenters' department. The laying down of the vessel on the scrieve board from the lines supplied by the designing department is undertaken by the loftsmen, who are usually highly skilled carpenters. The laying of the keel blocks ; the sighting of the blocks before and during construction ; the erection of the steel work and its shoring and fairing ; the launching operation ; the fitting of sparring and ceiling, of hatch covers, of rails and staunchions, of teak rails, bollards, fairleads, deck machinery, seats, awnings, masts and spars, etc., all come under the carpenter's jurisdiction, and the chief carpenter has much responsibility. Especially is this the case in connection with the launching operation, which demands the highest standard of workmanship and the best quality of material. From carefully analysed records of the wages expended in previous vessels it is possible to estimate the cost of the major sections of the carpenters' wages, and rates per ton for erection and launching can be arrived at, as can rates for laying decks, etc.

Joiner Work.

The building of a large liner affords employment for hundreds of joiners for many months. The preparation of the bulkheading for cabins and its ultimate erection on board, the manufacture of the articles of furniture required for cabins and offices, and the fitting up of the numerous storerooms on board afford ample work for this department. From the drawings, showing the arrangement of a ship, particulars are made up of the spaces occupied by the various types of accommodation provided, the number of cabins in each type, the extent and numbers of the lavatories and bathrooms, and the areas and particulars of the public rooms. Each type has its specified standard to be attained. Calculations are then made of the cost of the wood required and of the wages likely to be expended in each group. In first-class cabins, for example, cants are run on the deck for taking the divisions between the cabins, and overhead

runners are also necessary to support those divisions. On the ship's side, grounding is fitted to take the wood lining and also overhead to take the ceilings. Thus in each group of cabins, cants, runners, groundings, linings, divisional and boundary bulkheads, doors, door frames, architraves, mouldings, pilasters, ceilings and cornices must be taken account of, and if a group of cabins is thus dealt with, it is possible to arrive at rates, per cabin, for wood and wages. This is illustrative of the calculation carried out for each section, the standard varying according to the class of passengers carried.

In each cabin certain items of furniture are required—wardrobes, dressing tables, tallboys, pedestal cupboards, and so on—each of a style conforming to the standard of the accommodation. The numbers of the various articles of furniture required are made up and the costs of these obtained from makers of standing.

Although the fitting up of the cabins forms the chief joiners' item, an enormous amount of work, other than this, falls to be done by this department, including the boundaries, divisions and doors in the lavatories and bathrooms, all stairs and ladderways—apart from the main stairways which may form part of a separate contract—the fitting up of galleys, pantries, and storerooms, and the making and fitting of all gratings, teak windows, screen windows, teak houses, weather doors, and bridge-deck fittings. These are indicative of the extent of the work under this heading. In the estimation of the material and wages to be spent by this department it is of great assistance to have, in as much detail as possible, a record of the work actually carried out in a former vessel of the type under consideration, for it would be almost impossible for an estimate to be made direct from the plans and specifications submitted for tender, and some important items would assuredly be forgotten.

Plumbing and Sanitation.

Compared with pre-War liners the plumber work in modern vessels is vastly different. Running water to the basins in each cabin was unthought of twenty years ago, but now it is customary to have hot and cold water to each room. Private bathrooms are now provided for many of the first-class cabins, and these mean an enormous increase in the number of points to which the hot and cold water services must be led. From each of the units comprising the sanitary outfit suitable discharges are taken. In connection with the safety of the ship pipes are led from the bilges in the various compartments to the engine room pumps; arrangements are also made for filling and discharging the separate double bottom tanks and also for sounding them. Fire and wash-deck services are also provided. Each of the systems required is dealt with separately, the basin and bath supplies on, say, a basis of the number of points served, the bilge and ballast on a basis of the length of ship and the number of compartments, and so on.

Light, Heating, and Ventilation.

In a large liner several hundreds of sidelights and windows are required, varying in type according to their proximity to the water-line and the class of accommodation they serve. Definite quotations are obtainable for these, but the greatest care must be exercised in specifying the type required, as the costs vary very greatly. The provision of direct access to the ship's side from each cabin becomes a difficult problem with very large ships, and no attempt to secure it has been made in the great German liners the Europa and Bremen. Provided adequate ventilation can be secured for inner cabins, no real necessity exists for sidelights, which involve the introduction of long, narrow passages, wasteful of space and of no value as cabin accommodation. Modern mechanical methods of ventilation make inner rooms perfectly habitable, and the heating of these cabins by electric or steam radiators or by heated air from the ventilating units ensures their absolute comfort. The provision of ventilation and heating is one of the large items in expenditure. The firms which specialise in this work arrange the ventilating units according to the requirements of the various sections, and carry out the complete schemes to the satisfaction of the owners and builders.

Electrical Work.

Because of the costly plant required for the electrical services in large vessels this is one of the heaviest items in the cost estimate. It is usual for the deck machinery, such as windlasses and capstans, boat and cargo winches, steering gear and numerous pumps in the machinery spaces to be electrically driven. Electrical power must be provided for all the fans, radiators, radio telegraphy, galley plant, and the extensive lighting throughout the ship. These services require the installation of turbo and Diesel generators of large power, and in addition a powerful emergency set must be provided to give light should the main plant be put out of action by accident at sea. Many miles of cables are led from the generating sets to the various points calling for power, and many thousands of pounds are spent in this connection. The work of estimating the total expenditure is allotted to experts who determine the power required from the plant, the sizes of the cables and wires, the types of motors for the various units, and the character of fittings for the cabins and public rooms. On the basis of the number of points to which power and light must be given an estimate is made of the cost involved in material and labour. The basis of calculation is the expenditure in a previous ship of similar type, and notwithstanding the seemingly inextricable maze of cables on board ship this expenditure can be closely estimated.

Public Rooms.

In pre-War days the decoration and furnishing of the public rooms were usually left to the shipbuilders to execute, but with the increase in number of first-class liners and the desire for the work of specialists to be in evidence this work is generally allocated to

noted firms of decorators. So extensive are the apartments and so widely different are the quotations received that in order to safeguard themselves builders now state in their tender letter the amount which they have included to meet the expenditure in this direction. Such apartments as the dining saloon, smoke-room, library, lounge, ball-room, special cabins, galleries, staircases and entrances, swimming baths, gymnasiums, etc., come under this category. Approximate costs can be estimated on the basis of the areas of the spaces. The rates per square foot vary according to the nature of the rooms and the scheme of decoration decided upon. Each flight of stairs, for example, in a first-class liner may cost £1,000; the cost of one public room may reach £20,000 or more. It can be readily seen that a vast fortune can be expended in this connection, and that the only way to limit the expenditure is to fix on the price to be paid for each group of rooms and modify the designs, if need be, to conform with the limiting price.

General Equipment.

While a large section of the cost estimate is based on direct calculation of the weights and quantities of material to be worked into the ship, and is thus subject to a degree of error depending in amount on the skill of the estimator and the guidance available, an important part can be built up from actual quotations received from outside contractors. When a specification is sent to various builders for tendering purposes the makers of special gear all over the country receive inquiries for their particular equipment from these builders. This equipment comprises anchors and cables, berths, blocks, boats, boat davits, cooking apparatus, deck coverings, fire extinguishing plant, hoists, sanitary ware, nautical instruments, refrigerating machinery, steering gear, winches, windlasses, watertight doors, etc. In these connections it is necessary that the intention of the owners should be appreciated by the sub-contractor, and that the builder should not omit some vital item in the outfit which might readily be overlooked. Certain consumable stores are usually part of the owners' supply, such as blankets, bolsters, charts, chronometers, crystal, cutlery, earthenware, flags, linen, plated ware, silver, sheets, etc.; these form part of the completed ship from the owner's point of view, but do not enter into the builders' estimate.

Machinery.

An approximate idea of the costs of the machinery can be obtained on the basis of the cost per horse-power to be developed, but is not sufficiently accurate for direct tendering. Estimates are therefore made of the costs of the main and auxiliary machinery and of the boilers, funnels and uptakes. From preliminary designs of the turbines, condensers, shafting and propellers estimates are made of the material required and the labour involved in their manufacture. Quotations are received for the numerous pumps and gear of various descriptions required for the auxiliary plant, while the boiler estimate is made on the basis of type specified and the power to be installed.

Insurance and Docking.

When a close approximation has been arrived at as to the ultimate cost of a vessel inquiries are made regarding the insurance against builders' risks during construction, launching and trials. In the case of the Cunarder now being built at Clydebank this matter was so serious that the assistance of the Government was solicited in order to cover the risks involved. In addition to insurance of the ship and her machinery builders must provide for the Government schemes of unemployment insurance, workmen's compensation, etc., and these items form a direct charge against the cost. Provision must also be made for dry-docking the ship, for all towage, river and dock dues, for trial trip expenses, for Board of Trade and Lloyds' fees, and for cranage, travelling expenses, etc. When these items are added up they amount to a considerable sum, especially for large vessels.

Approximate Allocation.

An indication of how the various monies comprising the total cost of a ship are allocated may be gathered from the approximate figures in Table IV for a liner of the intermediate type, the items being expressed in fractions of the total cost :—

Table IV.

	Materials.	Labour.
Steel and rivets	·080	·070
Sheet steel	·003	·009
Smith work	·003	·006
Plumber work	·015	·015
Paint work	·007	·015
Carpenter work	·020	·020
Joiner work	·030	·040
Electrical work	·040	·010
Riggers and labourers	—	·010
Foremen and drawing office	—	·012
Main castings	·006	—
Sundry material	·020	—
	·224	·207

Outfit

Anchors and cables	·006
Berths	·006
Boats	·008
Boat davits	·008
Cooking apparatus	·007
Deck covering	·012
Insulation	·015
Refrigerating machinery	·010
Lavatories	·010
Rigging and ropes	·003
Canvas gear	·002
Steering gear	·005
Ventilation	·015
Upholstery	·008
Deck machinery	·010
Watertight doors and gear	·014
Smaller items	·020
	·159

SUMMARY.

Materials	·224
Labour	·207
Outfit	·159
Insurance, docking, etc.	·028
Decorating and furnishing public rooms	·052
Machinery (say)	·230
Builders' margin for charges and profit	·100
	1·000

NET AND TOTAL COST.

The maintenance of a shipbuilding and engineering establishment is expensive, and the cost must be met out of the work produced. Maintenance of the buildings and plant, rates, insurances for establishment, stationery, taxes, telephones, and the salaries and wages of officials, clerks, timekeepers, cleaners, firemen, etc., must be met. In order to cover such items establishment charges are added to the net cost and also a margin for profit. When the demand for ships is brisk the charges can be spread over the several ships under construction and be correspondingly less than if only one or two ships are being built. On the other hand, if work is scarce the keen competition induces builders to cut their charges and profit figure. In one particular case the tender figures ranged from £950,000 to £1,150,000, the probable reason being not so much differences in the direct estimate as that some of the tenderers kept their charges and profits figure up to a point sufficient to give a reasonable margin, whilst others cut keen into that section of the total price in order to obtain the work.

It is a matter for astonishment that the final cost of a ship may, at times, be found to be within one per cent. of the estimate, when it is remembered that such a variable factor as the labour element enters largely into the cost. Notwithstanding all that is said against the average workman the fact remains that ships to-day are being turned out as efficiently and economically as at any time in the history of shipbuilding. The output per man is up to the best standards, and the quality of workmanship is fully equal to that demanded by the managements.

It is recognised that the foregoing article deals in only a very perfunctory manner with the cost of ships. That this should be the case is unavoidable, since actual costs are secret and confidential; but at least some indication has been given of the amount of labour entailed in estimating and of the manner in which the various sums involved may be allocated.

COMPUTATOR.

CHAPTER XVII.

MERCANTILE MARINE MACHINERY.

In reviewing the progress of marine machinery during the past year, it is not possible to ignore the fact that the industry was very seriously handicapped, if not entirely crippled, by the deplorable condition of world trade. The lack of confidence for the improvement of commerce in the immediate future, the uncertainty as to the political situation which may develop as the result of disarmament conferences, the state of unrest engendered by the financial plight of many of the maritime nations, and the phenomenal fall in the prices of most of the essential commodities, have all had their repercussions on the freight markets, and consequently upon the demand for new warship and mercantile tonnage and its propelling machinery. A cursory inspection of the periodical returns published by Lloyd's Register at once reveals the present parlous state of affairs, and the congestion of laid-up shipping in all the world's harbours bears eloquent testimony to the evil times on which we have fallen.

In the last issue of "Brassey" surprise was expressed that, in this period of depression, advantage was not being taken to any marked extent of the opportunity of modernising existing machinery. It is now apparent, from extensive investigations made all over the country, that most shipowners are cognisant of the fact that such rehabilitation of their ships could be undertaken very economically at the present time, when the yards are empty and builders are only too anxious to accept work at rock bottom prices to enable them to carry on with a nucleus staff. Extreme financial stringency has been the sole cause which has prohibited even the most modest outlay on any work of the kind, even though the economic value of such modernisation could, under normal conditions, be indisputably demonstrated from many examples in which this rejuvenation has been carried out. It is a noteworthy fact, however, that one of the largest companies owning cargo-carriers had not one of their extensive fleet laid up, at any rate down to the autumn, and were able to keep all their ships in commission, this company having had the foresight to add to the machinery of many of their vessels certain of the methods now available, at low cost, for securing a very large reduction in fuel consumption, thereby diminishing one of the largest individual items of expense of ship operation to a figure consonant with elimination of loss, even in these days of fierce competition. That other British shipowners will follow this enlightened policy, as soon as financial conditions warrant, can scarcely be doubted, particularly as recent statistics indicate that a very large percentage

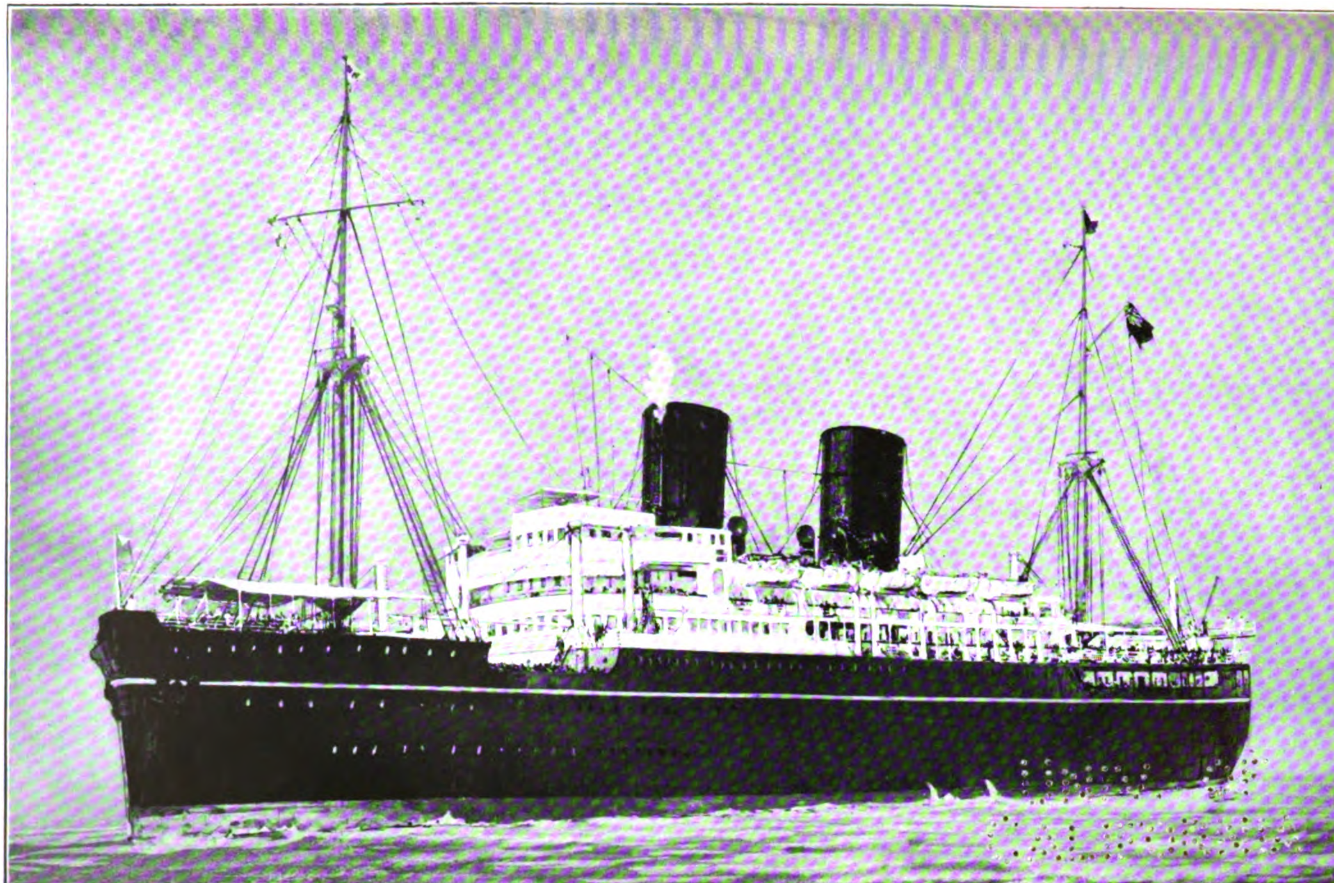
of our national tonnage is comparatively youthful, and any such expenditure would be amply recouped, given normal trading conditions, long before the expiry of the economical life of the ship.

Not only did the industry suffer under the heavy clouds of depression referred to above, but the gloom was enhanced by the loss of Sir Charles Parsons, Mr. Andrew Laing, and Sir Archibald Ross, whose decease bereaved the Tyne in particular, and the nation in general, of three of its most eminent marine engineers.

High-pressure Steam.

There was a marked tendency during the period under review towards higher pressures and temperatures, not only for high-powered liners, but also for vessels of smaller sizes. Although such increases did not bulk largely in the public eye, the advantages accruing from the utilisation thereof received more widespread appreciation, as can be gathered from the discussions which took place on several notable papers read before the professional societies.

In the liner category pressures of 400–425 lb. and a temperature of 750 deg. F. are now practically standardised for new construction. It appears probable that these figures will not be substantially exceeded in marine work until further metallurgical advances are made, and even then it is unlikely that much higher pressures will be adopted, and an increase of temperature will rather be preferred when materials available permit. Recent investigations of the behaviour of alloy and other steels subjected to "creep" have opened up a field for further research work in this connection. In the liner class, the most notable achievement of the year was the completion of the Empress of Britain by Messrs. John Brown & Co., for the Canadian Pacific Steamship Company. This outstanding example of British naval architecture and marine engineering has been remarkably successful in service, and it is understood that the fuel consumption obtained on trial—0·57 lb. of oil per s.h.p. hour for all purposes—has been maintained in service. This figure, which represents an overall efficiency bunker to propeller of 23½ per cent., is the best so far attained in steamships. The steam conditions in this vessel are 425 lb. pressure and 725 deg. F. temperature at the boilers, and 375 lb. and 700 deg. F. at the turbines. Similar figures apply to the Strathaird and Strathnaver, the two Barrow-built turbo-electric ships for the P. & O., to the new Cunarder at Clydebank, to the Monarch of Bermuda on the Tyne, referred to in last year's "Brassey" as the Mid Ocean (the name having meanwhile been changed), to the Rex and Conte di Savoia for the Navigazione Generale Italiana and the Lloyd Sabaudo respectively, now in hand in Italy, and to the Champlain and super Ile-de-France at the Penhoët yard at St. Nazaire for the C.G.T. In all these ships water-tube boilers, of either the Yarrow or the Babcock type, are installed, but in the Empress of Britain one of the boilers is of the design of Mr. J. Johnson, the Chief Superintendent Engineer of the Canadian Pacific Steamships, and the boilers for the French and Italian vessels embody certain modifications in accordance with



P. & O. LINER CORFU.
(Builders, Messrs. Alex. Stephen and Sons, Linthouse.)

local practice. Although not coming within the mercantile category, the British torpedo-boat destroyer Acheron is worthy of mention in view of the fact that she has demonstrated that even in the much more highly forced plant necessary in such craft results of like character can be obtained. In this ship the boiler pressure is 500 lb. and the temperature 730 deg. F. Although severe limitations of weight and space are imposed by Naval conditions, a fuel consumption of 0·608 lb. for all purposes has been recorded.

It is noteworthy that even in some existing vessels the working steam temperature has been augmented by modifying the design of the superheater, the elements being arranged completely in the combustion chamber and a substantial increase of the superheat thereby obtained. This has been done in some of the C.P.R. and P. & O. vessels, among others.

A steam pressure of 3,270 lb. has been employed in the German steamer Uckermark for the Hamburg-Amerika Company, the steam being generated in a Benson "critical pressure" boiler built by Messrs. Blohm & Voss, Hamburg. The high pressure steam is utilised in a special turbine from which it exhausts to turbines of normal pressure. It is understood that the trials have been very satisfactory, but no service data have, so far as is known, been published.

While several land stations, particularly in America, have adopted pressures ranging from 800 to 1,200 lb., the advantages to be obtained from these super pressures have not commended themselves to British marine engineering authorities as giving such extra economy as is warranted by the higher initial capital cost, combined with the necessity for absolute safety, reliability and reasonable maintenance charges.

Turbines and Turbo-electric Drive.

The output of steam turbine machinery with either electrical or geared transmission of power to the propeller shaft was confined to a small number of fairly large vessels, of which the Empress of Britain takes pride of place as being the highest powered equipment put into commission during the year. Her Parsons turbines are of the three unit type per set, and the power is transmitted to the screws by single-reduction gearing. The new Cunarder, building at Clydebank, of 180,000 s.h.p. on four shafts at 195 r.p.m., is to have machinery of similar type, except that each of the four units will have four turbines in series, arranged two forward and two abaft each main gear wheel.

The Rex and Conte di Savoia are similar to the Empress of Britain, although each has 50 per cent. more power approximately, and the Champlain at St. Nazaire for the C.G.T.—a 28,000 tonner of the Lafayette type—and L'Atlantique for the Cie Sud Atlantique all adhere to the single-reduction geared type of drive. The last-named ship is, however, an exception to the usual practice in that she is fitted with cylindrical boilers of normal pressure. The latest intermediate C.G.T. ship, the Colombie, built at Dunkerque, has

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also a geared turbine high-pressure 9,000 s.h.p. installation. Of the rest, the large P. & O. China service units Carthage and Corfu, and the British India Karanga and Kenya, are the most prominent.

With electrical transmission, the super Ile-de-France of 160,000 s.h.p. on four screws for the C.G.T.—a ship of approximately the same size as the new Cunarder—was being rapidly pushed on when inspected during the visit of the Institution of Naval Architects to the Penhoët yard at St. Nazaire in July. She, however, will not go into commission till 1933. The Monarch of Bermuda has four shafts each of 4,650 s.h.p. with two 7,500 kw. generators, and the electrical equipment has been supplied by the General Electric Company. Steam at 400 lb. pressure and 675 deg. F. temperature is supplied by eight Babcock & Wilcox boilers. Two large turbo-electric liners for the P. & O. Company, the Strathnaver and Strathaird, were launched by Messrs. Vickers-Armstrongs at Barrow, and the first went into service in the autumn. These ships are improved editions—of 28,000 s.h.p.—of the Viceroy of India, which has proved very successful in service. Both have electrical plant by the British Thomson-Houston Company, and each has four high-pressure Yarrow-type boilers, similar to those in the Empress of Britain, working at 400 lb. pressure and 725 deg. F. temperature. In these ships the boilers for auxiliary purposes are also of the water-tube type, in place of the cylindrical pattern fitted in the C.P.R. vessels. Another Barrow production, also fitted with British Thomson-Houston electrical plant, is the Rangatira for the Union Steamship Company of New Zealand, a twin-screw vessel of 13,500 s.h.p. with Yarrow boilers working at 400 lb.

In the U.S.A. two large ships, the President Hoover and the President Coolidge, for the Dollar Steamship Lines, have 26,500 b.h.p. turbo-electric equipment by the General Electric and Westinghouse Companies respectively, the steam being supplied by twelve Babcock boilers working at the relatively low pressure and temperature of 300 lb. and 620 deg. F.

Six 10,500 b.h.p. plants are in course of construction for the United Fruit Company, the earliest of whose units, the San Benito, was built in this country by Messrs. Workman, Clark some years ago. It is a curious commentary on this system of propulsion that, while it appears to have found great favour in the United States for both mercantile and naval work, its adoption in this country has been limited to two companies, the P. & O. and its associated lines, and Messrs. Furness Withy. The British Admiralty is not, so far, convinced that it offers advantages over the geared drive.

The U.S.A. Government has decided to substitute a geared drive in the battleship New Mexico, with a view to increasing the speed. In other words, it has been appreciated that, whatever other merits the electric drive may have, it cannot compete with mechanical transmission in steam and fuel consumption. It may be remarked that, except for the new super Ile-de-France, no Continental vessel of any importance has been, or is being, as far as is known, fitted with electrical transmission.

Diesel-electric Drive.

There has been a recrudescence of popularity to a limited extent in Europe of the Diesel-electric alternative, particularly for small craft, tugs, dredgers, and ferry-boats, in which special conditions or dual duty from the main prime movers call for such an equipment as can fulfil the demands. Besides vessels in these categories, however, there were completed by Messrs. Scott, of Greenock, two oil tankers having Ingersoll-Rand Diesel engines built by Messrs. Carels at Ghent with British Thomson-Houston d.c. generators and motors. These ships, the Permian and Winkler, are sisters to the Brunswick noticed in the 1930 issue of "Brassey," and were ordered because of the satisfactory results obtained with the earlier ship. They are fitted with bridge control, and are for the Atlantic Oil Shipping Company.

A large Diesel-electric suction dredger was built by the Deutsche Schiff-und Maschinenbau at Bremen for the port of Bordeaux. This vessel has two main propulsion generators driven by M.A.N. engines, with two 1,140 s.h.p. motors, one on each shaft. The power, when not propelling the ship, can be diverted to drive the large dredging suction pumps, this arrangement obviating the provision of separate prime movers for this duty, and affording a notable example of the suitability of this type of drive to double-purpose vessels.

Possibly the vessel which has aroused the greatest interest in this country is the Lochfyne, a small passenger craft for service on the west coast of Scotland, which was built for Messrs. MacBrayne by Messrs. Denny at Dumbarton. The propelling plant comprises two five-cylinder trunk-piston four-stroke Davey-Paxman Diesel engines of 1,000 b.h.p., supercharged on the Büchi system, and each driving a 540 kw. generator at 330 r.p.m. Direct current is employed at a pressure of 520 volts. Coupled in tandem is an auxiliary set for light, power and excitation, this set being of 48 kw. at 230 volts. The motors are of 670 b.h.p. at 435 r.p.m., and it should be observed that the propellers rotate faster than the Diesel engines; in other words, a step-up electrical transmission has been fitted in lieu of the usual step-down. This has been necessitated by a desire to run the Diesel engines at a moderate speed, while the propelling revolutions have been dictated by hull considerations. The electrical equipment, which includes bridge control, was furnished by the Metropolitan-Vickers Electrical Company. It is understood that the owners are well satisfied with the performance of the plant, and that the running costs for fuel are remarkably low for a set of this character, which is the first Diesel-electric installation to be fitted to a passenger vessel in this country.

Exhaust Steam Turbines.

The number of vessels to which exhaust steam turbines were fitted during last year was naturally smaller than during the preceding twelve months, the accentuated depression accounting for the scarcity of new orders of any description. Nevertheless, some

notable vessels were so equipped, among which may be cited the Hilary for the Booth Line, the Somali and Soudan for the Hain Line, the Ganges for the Nourse Line, the San Pedro for the Compagnie Générale Transatlantique, the tanker Pan-Bolivar, and several trawlers. All these were new ships, while among the owners having existing ships modified were the Clan Line (several units), the Federal Line for their Cumberland, Norfolk, and Huntingdon, and the Norddeutscher Lloyd for their General Von Steuben (ex Munchen). All these ships were equipped on the Bauer-Wach system. Two of the vessels mentioned and illustrated in last year's "Brassey"—the Dalhanna and the Daldorch—after more than a year's service were showing average voyage fuel coefficients of 21,000 to 23,000, figures which are extraordinarily high for coal-fired saturated-steam machinery.

Messrs. Parsons completed and installed a turbine on their own system in the Kingswood for Messrs. Constantine, of which excellent accounts have been published, but the Brown-Boveri sets for the Rotterdam-Lloyd Blitar, and the Hamburg-Amerika liners Ammon and Amasis, were not, it is believed, placed in service during the year.

The alternative scheme in which the exhaust steam is fed to a turbo-generator delivering its current to a motor on the propeller shaft was also subject to the wave of depression, and it is understood that no vessels beyond those mentioned last year were put into service in this country. An interesting plant was, however, fitted by the Aktiebolaget Lindholmen in Sweden to the Trione, in which the exhaust steam from the triple-expansion engine is led to a turbo-generator. Part of the current thus obtained is used for general electrical purposes in the ship, but as these absorb only a small proportion of the quantity available, the balance is passed to a superheater or dryer in which it is transformed into heat through resistances. This heat is used to raise the temperature of the steam issuing from the high-pressure cylinder before it is admitted to the intermediate-pressure cylinder. By this means the condensation losses in the intermediate and low-pressure cylinders are reduced, and the turbine itself is supplied with drier steam than it would receive normally. The high-pressure cylinder is of the Lentz type, and as the steam conditions are 200 lb. pressure and 575 deg. F. temperature, the loss in this cylinder is small. It does not appear unreasonable to suppose that it would be a more economical method if the electric power devoted to superheating the steam were transferred to the main shaft by means of a motor, as is done in the ordinary exhaust turbine electric drive, and live steam were utilised for reheating in lieu of electricity. Only if it can be shown that the thermodynamic efficiency of the intermediate and low-pressure cylinders is increased by reheating to such an extent as to more than discount the losses in the double transformation of steam to electricity and electricity to heat can the system have any advantage at all, and in any case the overall efficiency could not compare with the straight exhaust steam turbine system under similar conditions of operation.

In the P. & O. steamers Ranchi, Chitral, and Maloja, and also in the Monowai (ex Razmak) of the Union Steamship Company of New Zealand, electric generators were installed, operated from Bauer-Wach exhaust turbines by means of an auxiliary Vulcan hydraulic clutch when at sea, and by their own independent turbines when in harbour or when the exhaust turbine is not in use, the change from one means of drive to the other being automatically effected. It is understood that these plants have enabled a considerable reduction of auxiliary fuel consumption to be achieved, and the scheme appears to be very attractive in reciprocating-engined ships when the electric load is considerable.

Cross-Channel Vessels.

The output of cross-channel vessels was not high, but a few craft of this specialised class were finished that warrant more than passing attention, particularly the Lochfyne, which may be included in this category, and has already been referred to, and the Côte D'Azur, the new Dover–Calais packet. The latter is fitted with a more or less standard arrangement of geared Parsons turbines of 13,000 s.h.p., and is notable chiefly for having four side-fired boilers of the Rauber & Luquet water-tube type. These boilers, which work at the moderate pressure of 240 lb., bear a family resemblance to the Babcock & Wilcox new SX type. They have an upper steam drum with vertical front headers, in which bent tubes curving upwards and backwards are fitted.

The rear ends of these tubes are connected to headers (in the Babcock design to a drum) which are inclined at an angle of about 45 deg. to the vertical towards the steam drum. The front headers are nippled to lower square section feed collectors (drum in the Babcock design), while the superheater headers are also rectangular in cross-section, as compared with circular in the Babcock boiler. The usual hairpin superheater tubes are fitted. These boilers, which were built by the French Babcock Company, are the first of the type to be fitted, and the results obtained easily exceeded the guarantees given. A sister ship, the Côte D'Argent, is in hand.

Messrs. Denny & Co., who specialise in cross-channel vessels, were not so fully engaged as usual, but completed the Princess Margaret for the Stranraer–Larne service of the L.M.S. Railway and the Slieve Bloom, a turbine driven cargo steamer for the same company's Holyhead–Dublin trade. They had in hand a sister to the latter and a modified Isle of Jersey—the Isle of Sark—for the Southern Railway's Channel Islands service, the latter being notable as the first British vessel of the Maier form. The Fairfield Shipbuilding and Engineering Company delivered the St. Seiriol for the Liverpool–North Wales traffic, this ship being a turbine-driven craft similar to the St. Tudno, built by the same company. Messrs. Cammell Laird & Co. had in hand two replace vessels of the "Saint" class for the G.W. Railway's Fishguard–Rosslare route, and a new paddle steamer for the General Steam Navigation Company's Thames–Kentish Coast traffic. A cross-channel steamer

specially built to carry motor-cars to France, the Auto-carrier, was also put in service, but apart from the construction of the vessel for its special duties it has no machinery features which call for comment. Of river steamers the L.N.E. Railway Company added to their Clyde fleet the Jeanie Deans, a triple expansion paddle-steamer built by the Fairfield Company, and the L.M.S. Railway Company ordered a turbine steamer of the Duchess of Montrose type from Messrs. Harland & Wolff, also for Clyde traffic.

Internal-combustion Engines.

The returns issued by Lloyd's Register indicate that the relative popularity of the Diesel engine continues, particularly abroad, for nearly every class of vessel except the largest transatlantic liners, on routes where fuel oil can be obtained at an economical cost. The accompanying tables give the volume of tonnage and horse-power of both steam and motor vessels under construction at June, 1930, and June, 1931, as average figures for the years, for the leading shipbuilding countries of the world, and show the relative position of the two methods of propulsion. It will be observed that France, Italy, and the United States show considerable increases in their steam tonnage and horse-power, these being due practically entirely to the large steam-driven liners under construction. The other countries show large decreases in their steam tonnage and smaller decreases in their motor tonnage and horse-power; these diminutions are particularly accentuated in this country, France, Holland, Japan and the U.S.A. From the figures it will be seen that over the year British steam tonnage under construction decreased by 39 per cent., and the world figure by 21 per cent., while the British motor tonnage being built decreased by 72 per cent., the world figure being 51 per cent. This extraordinary falling off in British motor tonnage—which would be even more marked were the White Star liner Georgic excluded—is emphasised strongly by the fact that during the period March to June, 1931, only three small craft of a total of 560 tons were ordered.

It should be noted that in Italy shipbuilding receives a considerable Government subsidy, and is showing greater activity than in any other country, although it is doubtful if bolstering up an industry by this or other artificial means will prove to its advantage in the long run. In the United States and France, whose tonnages and powers also show increases, these increments are almost entirely due to the few large liners under construction. In the case of France, it is common knowledge that the C.G.T. have received assistance from the French Government to enable them to carry out their programme, while Government guarantees have, it is understood, been available for the two large vessels under construction in the United States.

Several notable vessels with internal-combustion engines were put into commission during the year, ranging in size from the White Star Britannic, with two double-acting four-stroke units with a total of 20,000 b.h.p. down to the Lochfyne of 1,400 b.h.p. The Britannic's machinery, which is being duplicated in the Georgic

building at Messrs. Harland & Wolff's yard at Belfast, is of similar design to several installations already in service in the Union Castle and Royal Mail Lines.

TONNAGE UNDER CONSTRUCTION IN CHIEF SHIPBUILDING COUNTRIES.

	Steamers.			Motorships.		
	June, 1930.	June, 1931.	Change.	June, 1930.	June, 1931.	Changes.
	Tons.	Tons.	Per Cent.	Tons.	Tons.	Per Cent.
Gt. Britain . . .	556,800	339,700	−39	831,000	213,400	−72
France	105,000	166,100	+58	81,500	45,800	−63
Germany. . . .	73,000	12,000	−83	164,500	118,400	−28
Holland	14,200	5,300	−63	173,200	103,000	−40
Italy	65,200	103,300	+58	77,100	67,300	−13
Belgium	13,200	—	−100	—	2,200	+100
Norway	25,300	9,000	−64	14,700	13,800	− 6
Sweden	11,100	9,300	−16	115,800	101,100	−13
Denmark . . .	11,400	3,500	−69	104,600	87,100	−17
Japan	10,600	6,400	−40	111,000	39,900	−64
Spain	3,500	200	−94	62,000	60,500	− 2
U.S.A.	193,600	284,000	+55	35,700	15,100	−58
	1,082,900	938,800	−21	1,771,100	867,600	−51

HORSE-POWER UNDER CONSTRUCTION IN CHIEF SHIPBUILDING COUNTRIES.

	Steamers.			Motorships.		
	June, 1930.	June, 1931.	Change.	June, 1930.	June, 1931.	Changes.
	H.P.	H.P.	Per Cent.	H.P.	H.P.	Per Cent.
Gt. Britain . . .	468,100	425,400	−9	423,200	134,400	−69
France	100,500	109,300	+9	51,500	44,500	−14
Germany. . . .	65,200	31,000	−53	233,600	168,400	−28
Holland	8,900	5,800	−35	88,300	81,700	− 7
Italy	8,100	239,300	+295	127,900	112,000	−13
Belgium	46,500	700	−960	3,000	2,100	−30
Norway	28,500	13,000	−54	8,000	6,000	−25
Sweden	10,900	4,500	−59	91,500	91,800	—
Denmark . . .	10,300	2,000	−80	158,200	87,800	−45
Japan	11,200	6,500	−42	91,300	27,700	−70
U.S.A.	186,500	339,000	+182	31,100	13,800	−55
	944,700	1,156,500	+22	1,302,600	770,200	−41

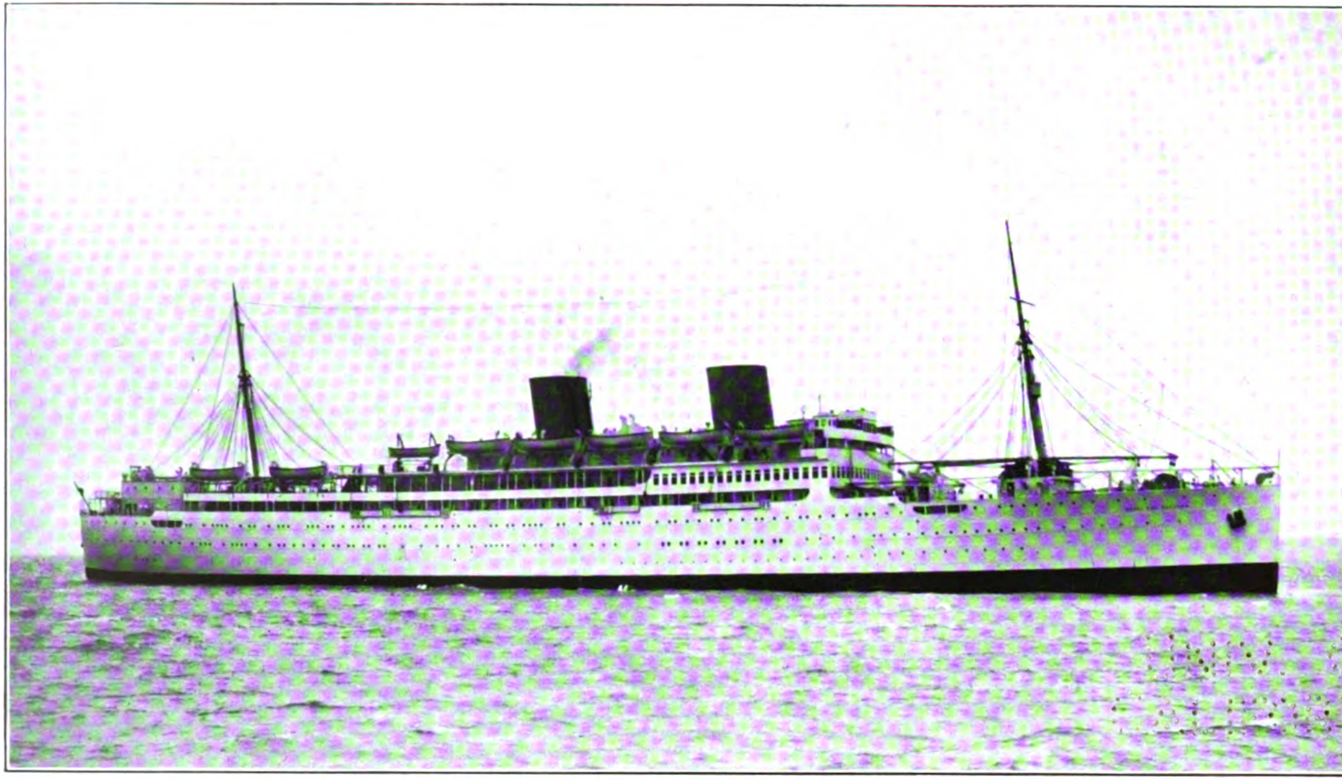
It is becoming increasingly apparent that the volume of expert opinion is tending strongly away from these very large relatively slow-running units, and it has even been reported that their removal from one of the Royal Mail vessels has been seriously contemplated. The general trend is undoubtedly in favour of faster running trunk-piston engines, as fitted in the four-shaft Pacific Steam Navigation

Company's Reina del Pacifico—also built by Messrs. Harland & Wolff—each engine of which is a 12-cylinder unit giving 5,500 b.h.p. at 145 r.p.m., and supercharged on the Büchi system. High-speed machinery has also been fitted in the Tyne–Bergen cross-channel vessel Venus, which has two ten-cylinder Burmeister & Wain motors, each of 4,000 b.h.p. at 160 r.p.m., supercharged on the builders' system, while the Victoria, belonging to the Lloyd Triestino, has four Sulzer two-stroke engines giving 4,250 b.h.p. at 130 r.p.m., which, however, are of the usual crosshead type. A few examples of geared Diesels have been put into service, the most notable being possibly the Kota Agoeng of the Rotterdam-Lloyd, in which two M.A.N. five-cylinder two-stroke double-acting engines, each of 2,750 b.h.p. at 215 r.p.m., are coupled to a single shaft by means of gearing and transmit their drive through Vulcan hydraulic couplings which eliminate any trouble that might be experienced in applying a highly fluctuating torque to toothed gears.

Among the larger slow-running engines the following may be cited as typical examples: the two double-acting four-stroke eight-cylinder engines, each of 6,900 b.h.p. at 98 r.p.m., in the Warwick Castle, built for the Union Castle Line by Messrs. Harland & Wolff; the Doxford engines of the Otaio by Messrs. Vickers-Armstrongs, and the Sulzer engines of the Orari and Opawa by Messrs. Stephen, all three being twin-screw installations of 9,450 b.h.p. at 120 r.p.m. for the New Zealand Shipping Company; and the Sulzer engines of 7,700 b.h.p. at 110 r.p.m. of the Worcestershire, built for the Bibby Line by the Fairfield Company. In the Europa, a sister ship to the Amerika, a double-acting two-stroke engine of 7,000 b.h.p. was installed by Messrs. Burmeister & Wain, who also fitted their first two-stroke single-acting engine in the Kalundborg. An eight-cylinder double-acting two-stroke engine of 7,600 b.h.p. at 106 r.p.m. was supplied by Messrs. Sulzer for the Tanjandoen, of the Stoomvaart Maatschappij Nederland, while of single-acting Sulzer engines of normal design large examples were placed in the Dempo by the Fijenoord Company, and in the Georges Phillipar at St. Nazaire.

Boilers and Fuel.

In last year's issue of "Brassey" it was remarked that the employment of powdered coal as boiler fuel was not conspicuously prominent. A similar position exists to-day. Some progress has, however, undoubtedly been made, although much still remains to be done to adapt pulverised coal to marine work on a commercial basis. It will be recalled that early work on fuel-oil burning underwent many vicissitudes, and a considerable period of experimental work elapsed before the practically perfect plant available to-day was evolved. The case of pulverised coal bears many analogies to the pioneer days of fuel-oil burning, and the early troubles which have occurred in some vessels, in which grinding and distribution plant has been fitted, have yielded valuable experience. While certain owners have reverted to either solid coal or oil fuel, others have persevered and are satisfied that the system is sound. It is



PACIFIC STEAM NAVIGATION COMPANY'S M.S. REINA DEL PACIFICO.
(Builders, Messrs. Harland & Wolff, Belfast.)

understood that the Hororata, in which the Howden-Buell system is fitted, is now operating with greatly improved results, while the Clark-Chapman design, which is fitted in the Berwindlea, the Harrison liners Musician and Recorder, and the Donau, Stassfurt, Metz and Bassure de Baas on the Continent, is also to be installed in two vessels under construction in Japan. The Todd Company in America have supplied several plants to small and moderate size American vessels, with apparently satisfactory results. Their installation in the Johnson liner Incemore was mentioned last year.

A new type of mechanical stoker—the Taylor—has been fitted to the hand-fired Babcock boilers of the Beaverhill, one of the Canadian Pacific cargo vessels, and it is believed that the last remaining hand-fired "Beaver" ship is to be similarly dealt with.

The cylindrical boilers in several ships have been equipped with superheaters of a new type during the past twelve months. The novelty consists in placing the whole of the superheater elements bodily in the combustion chamber, only the pipes conducting the saturated steam to, and the superheated steam away from, the superheater itself passing through the smoke tubes. Much higher temperatures are thereby attained, and burning-out of the superheater tubes and excessive maintenance charges have not been experienced so far.

The only other boiler novelty is the water-tube design already mentioned as being fitted to the Côte D'Azur, and the similar Babcock SX pattern which is being applied in some American warships. Generally, the tendency is to adopt a standard pressure of 230 to 250 lb. for Scotch boilers and 400 lb. for water-tube boilers, and in the latter design to provide rather higher ratings than have been customary in the last few years. Several well-known firms have acquired licences to build the Johnson design; one of these is fitted in the Empress of Britain, but so far no further examples in marine work have been completed, except one in the C.P.R. Princess Hélène.

Reciprocating Engines.

There is not much to record in the shape of progress in reciprocating engines, except that the tendency to depart from the usual slide valves, operated by Stephenson link gear, is becoming more strongly marked. In particular, a fair number of engines of small and moderate sizes have been fitted with Lentz drop valves and gear, and there have been some conversions in which the high-pressure cylinder has been removed and this system substituted.

In some small vessels built on the Continent the Christiansen-Mayer design has been installed. These engines comprise an ordinary high-pressure cylinder combined with a semi-uniflow low-pressure cylinder. The steam control to both cylinders is effected by a single piston valve. Very excellent results are stated to have been obtained from this design, steam consumptions of 10 to $10\frac{3}{4}$ lb. an hour having been recorded with an 800 i.h.p. engine working with 213 lb. pressure, 590 deg. F. steam temperature and 25·7 in. vacuum, at a consumption of 1·17 lb. of 14,000 B.Th.U. coal per i.h.p. hour.

The large four-cylinder triple engines in the City of Sydney and City of Barcelona, which have Caprotti valve gear, had some minor modifications made in them as dictated by experience in service, and are understood to be giving very satisfactory results with excellent fuel consumptions. Of large reciprocating engines of normal design, good examples were the quadruples fitted in the Soudan and Somali for the Hain Line (both in combination with Bauer-Wach exhaust steam turbines), and those in the large whale oil factory ships Kosmos II, Vikingen and Vestfold.

A new system of propulsion has been tried out in small vessels on the Danube and Lake Constance—the Voith-Schneider system—which consists of a series of propeller blades arranged to rotate about a vertical axis which can be displaced from the centre line of the vessel according as it is desired to go ahead or astern or to turn to port or starboard. The success so far attained seems to promise a favourable future for the system in shallow-draught river and inland water vessels.

A new type of prime mover—the Malone engine—was described to the Royal Society of Arts, and several examples have actually been in operation, but its applicability to ships has not yet been demonstrated in practice.

The foregoing summary of work in progress and achieved during 1931 indicates briefly the leading features of the industry. There were, of course, other phases of activity which, though some did not reach fruition, show conclusively that while production is at a low ebb exploration of possible sources of improvement has been vigorously prosecuted. Particularly has the search been active not only into the possibilities of utilising coal in powdered form in the internal-combustion engine, but also into the commercial aspect of its hydrogenation into a liquid hydrocarbon. Research was also actively pursued on the " creep " effect in metals, in view of the tendency to increase the pressure and temperature of steam in power-generating plants, and extensive knowledge is being accumulated on this somewhat obscure phenomenon.

Generally speaking, the year proved one of the blackest in the annals of the industry not only in this but in all maritime countries, and the outlook for the future could only be regarded with dismay, were it not for the fact that, in spite of political and economical adversity, technical achievements are being steadily, if not spectacularly, extended and consolidated.

R. J. Butler, M.I.N.A.

CHAPTER XVIII.

Notable Merchant Ships of the Year.

Although the shipyards were employed to a great extent in building oil tankers, some noteworthy passenger ships were constructed last year. It is true that, as must be expected during a severe shipbuilding slump, their number is considerably smaller than would have been built in a normal working year, but nearly every ship of large size presented an individuality which gave the shipyards and their designing staffs scope for the embodiment of novel features.

The largest ship was the Rex, of about 50,000 tons gross, launched in Italy last August. The second was the Lloyd Sabaudo liner Conte di Savoia, of about 48,000 tons, launched at the end of October. The Canadian Pacific liner Empress of Britain, of about 42,400 tons, was the largest ship completed during the year. Next came the 40,000 tons South American liner L'Atlantique, and the Manhattan, the first of two 30,000 tons liners for the United States. Then in succession were the White Star liner Georgic, of 27,000 tons, launched in November, a sister ship to the Britannic, and the Champlain, of 26,000 tons.

After these are several interesting ships round about the 20,000-tons mark. They include the P. & O. liners, Strathnaver, completed at the end of August, and Strathaird, launched on July 18; the Dollar liners, President Hoover and President Coolidge; the Mariposa, the first of three Matson Line vessels for the California—Australia service; the Union-Castle liner, Warwick Castle; and the Furness-Withy, Monarch of Bermuda. The machinery of seven of these fourteen ships consists of geared turbines; five have electric drive; and two are motorships. Other ships, rather smaller but all above the 10,000 tons margin, are the Reina del Pacifico, Dempo, Monte Rosa and Monte Pascoal, Carthage and Corfu, Victoria (the fastest motorship in the world), Worcestershire, Achimota, Opawa and Orari, Europa (a motorship belonging to the East Asiatic Company), Georges Phillipar and Colombie.

The Rex, which is completing at the Ansaldo shipyard for the Navigazione Generale Italiana, is to be one of the fastest vessels in the service between the Mediterranean and the United States of America, and is the largest ship built in an Italian shipyard. She is due to sail from Genoa to New York next March, making a seven days' passage with a speed of 27 knots. With a length of about 880 ft., she will have a gross tonnage of about 50,000 tons. Accommodation will be provided for 2,300 passengers, of whom 400 are first, 250 second, 300 tourist, 400 intermediate, and 900 third class. There will be

the usual public rooms, and they will be decorated lavishly. Other features are to include extensive enclosed verandahs and long promenades for all classes, separate gymnasiums for adults and children, a theatre complete with stage and dressing-rooms, and a chapel. Open-air swimming baths are to be provided for both first and second class, and there will be a garage with special lift for handling motor cars. The propelling machinery consists of four sets of high-pressure geared turbines.

The Conte di Savoia, built at the San Marco yard of the Cantieri dell' Adriatico, Trieste, has an overall length of 811 ft. 9 in., and is to run in conjunction with the Rex. Her total complement is about 3,000, including 720 personnel. A feature of the ship is the fitting of three Sperry gyro-stabilisers, each with a rotor 13 ft. in diameter and weighing 100 tons. She will be propelled by geared turbines and is to have a speed of 27 knots.

Empress of Britain.

The most remarkable ship completed during the year was the Empress of Britain, which Messrs. John Brown & Co. built at Clydebank for the Southampton—Quebec service of Canadian Pacific Steamships. Not only did she prove on trials to be the most economical steamship afloat, but she ushered in a new era in the history of inter-Empire travel, and gave her owners an opportunity of describing her as the largest and fastest liner plying between two British ports. The largest liner built in this country since the War, she is 760 ft. 6 in. long overall, with a gross tonnage of 42,348 tons. Her service speed is 24 knots on about 60,000 s.h.p., and she has accommodation for 465 first, 260 tourist, and 470 third class passengers, the total number of persons carried, including officers and crew, being 1,909. (Plate facing page 114.)

A feature of the vessel is the luxury of the passenger arrangements, the average space per head being probably larger than in any other ship of this class. In contrast to the " Duchess " class and the principle adopted with many liners, no uniform style of decoration was followed. Instead, a number of well-known artists were invited to design different parts of the accommodation. Thus, the ballroom or Empress room is by Sir John Lavery, R.A.; the lounge or " Mayfair " by Sir Charles Allom; the smoking-room or Cathay lounge by Mr. Edmund Dulac; the card-room, writing-room, and long gallery (" The Mall ") by Messrs. P. A. Staynes and A. H. Jones; the American or knickerbocker bar by Mr. W. Heath Robinson. All these rooms are on the lounge deck. Then the dining-room, or Salle Jacques Cartier, on D deck, is by Mr. Frank Brangwyn, R.A.; the swimming bath, or Olympian pool, on F deck, by Messrs. P. A. Staynes and A. H. Jones; and the children's playroom, on the sports deck, by Mr. W. Heath Robinson. There are ten decks—sun deck, sports deck, lounge deck, and A to G decks. The A deck runs the full length of the vessel, the lounge deck above extending for 648 ft. The boat deck is 396 ft. long at its sides, and in the centre, in way of the first class public rooms, the sports deck extends

for 455 ft., with a height of 14 ft. Above the sports deck is the sun deck, which is 192 ft. long.

Two interesting features will be noted by naval architects. One is that the scantlings of the vessel were determined by treating the structure as a continuous girder to the sun deck, thus eliminating the use of expansion joints in the superstructure. The other is that Martinel high elastic limit steel was used for some of the deck plating on the lounge deck and A deck and for the side plating in that vicinity, a reduction in top weight being thereby effected.

The propelling machinery consists of four sets of single-reduction geared turbines, capable of developing about 60,000 s.h.p. for a sea speed of 24 knots. Steam is provided by one Johnson-type and eight Yarrow-type water-tube boilers, all oil-fired. The working pressure is 400 lb. per sq. in., and the steam temperature 725 deg. F.

American Ships.

Some large ships were turned out of American shipyards during the year, and several are under construction. The Dollar Line put two new turbo-electric ships into service on their round-the-world route, the President Hoover and President Coolidge. These are twin-screw vessels, 653 ft. long overall, and have a gross tonnage of about 21,900 tons. Accommodation is provided for 307 first, 133 tourist, 170 third-class passengers. There is also room for about 380 supplementary steerage passengers, who are taken on at certain ports of the company's Far East run in which the vessels engage. The space available for refrigerated cargo amounts to 59,450 cu. ft., and for general cargo to 553,200 cu. ft. Both vessels were built by the Newport News Shipbuilding Company. The machinery of the President Hoover was supplied by the General Electric Company of America, and of the President Coolidge by the Westinghouse Company. The turbo-alternators have a normal output of 20,400 kw. at 4,800 volts. The motors develop about 13,250 s.h.p. on each shaft at 133 r.p.m. Steam is supplied by oil-fired Babcock & Wilcox water-tube boilers, working at 300 lb. per sq. in. The vessels have a service speed of about 21 knots. (Plate facing p. 134.)

The Matson Line have three twin-screw vessels in hand for their service between California and Australia *via* the South Sea Islands. These ships, Mariposa, Monterey, and Lurline, are to be 632 ft. long, with a gross tonnage of 22,000 tons and a guaranteed trial trip speed of 20½ knots. The Mariposa, which was launched on July 18 at the Fore River yard of the Bethlehem Shipbuilding Corporation, Quincy, Mass., is to go into service in February, and will be followed shortly afterwards by the Monterey, and by the Lurline in 1933. The ships will accommodate 550 first and 250 cabin class passengers, and there is provision for making the ship all first class, this being accomplished by standardising the cabin equipment. The propelling machinery will consist of single-reduction geared turbines, taking steam from water-tube boilers.

Two 30,000-ton liners which are building by the New York Shipbuilding Company at Camden, N.J., for the United States Lines, are

the largest merchant ships under construction in America, and are 705 ft. long, carrying about 1,300 passengers. Some of the public rooms are being designed to represent various phases of architecture predominating in different parts of the United States, while others will be in period designs. The keel of the first of the two vessels was laid on December 4, 1930, and she is expected to be ready for the 1932 tourist traffic. They are to be twin-screw vessels with single-reduction gearing, developing 34,500 s.h.p., and with a designed speed of 22 knots are to run for the time being in conjunction with the Leviathan on the New York—Cherbourg—Southampton route. The first is to be named Manhattan.

Four ships, the Excalibur, Exochorda, Exeter, and Excambion, built for the American Export Lines, are now in operation. Each vessel provides accommodation for 152 first-class passengers, and has a deadweight capacity of 9,300 tons with refrigerated space for 32,000 cu. ft. of perishable freight. The vessels are 475 ft. overall, and of 9,350 gross tons. On trials they attained over 18 knots. The main propulsion machinery, built by the New York Shipbuilding Company, consists of Parsons-type triple-expansion turbines with Falk single-reduction gearing arranged for driving a single screw. Steam is supplied at 350 lb. working pressure and 200 deg. F. superheat by four Babcock & Wilcox water-tube boilers arranged in one fireroom. (Plate facing p. 138.)

The United Mail Steamship Company, a subsidiary of the United Fruit Company, is building six ships, two of which have been launched, to add to its "Great White Fleet," as the United Fruit ships are popularly known. They are for service to Central American countries, to be operated in the passenger and fruit carrying trade. They measure 447 ft. overall and are of 7,200 gross tons, with a sea speed of 18 knots. All the spaces available for cargo are insulated, and provided with refrigerated air for the carriage of fruits, particularly bananas. The propulsive machinery is turbo-electric, supplied by the General Electric Company, with two main turbo-generators and two propulsion motors, one for each of the two shafts. Steam will be furnished by four oil-burning Babcock & Wilcox water-tube boilers. The working pressure is 350 lb., and the superheaters will give about 230 deg. F. superheat. The machinery is capable of developing 10,500 s.h.p.

New P. and O. Liners.

The P. and O. Line's contribution of new tonnage consists of two large turbo-electrically propelled liners, Strathnaver and Strathaird, for the mail and passenger service between London, Bombay, and Australia, and two 14,500-tons geared turbine liners, Carthage and Corfu, for the China and Far East service. The Strathnaver and Strathaird (see Frontispiece) are the largest ships in the P. and O. fleet, and are also the most luxuriously appointed. Built by Messrs. Vickers-Armstrongs at Barrow, they are 664 ft. long, with a gross tonnage of over 22,000 tons. Unlike the other ships in the company's fleet, they have all-white hulls and three stream-

lined funnels painted light yellow. The central funnel is the only one through which the boiler furnace uptakes pass. Only two classes of passengers are carried, and, following a decision taken for some other ships of the company, tourist class has been substituted for second class. There is accommodation for 498 first and 668 tourist class passengers. Of the first-class passengers 262 have single-berth cabins, and the remainder two-berth cabins. There are 12 *de luxe* cabins, each with private bathroom, and one special suite. Swimming baths are provided for each class, and a large section of the promenade space can be screened off for dancing in the evenings. The main propelling machinery, supplied by the British Thomson-Houston Company, Rugby, consists of two 10,700 kw. turbo-alternators, 3,000 r.p.m., 3,000 volts, driving two synchronous propulsion motors each of 14,000 s.h.p. at 125 r.p.m. The vessels can make about 23 knots at full power. Cruising speeds between 16 and 18 knots can be accomplished with one turbo-generator alone. Steam for the main engines is provided by four oil-fired Yarrow water-tube boilers of the five-drum double-flow side-fired type, working at 400 lb. per sq. in. pressure and 720 deg. F. temperature.

The Corfu and Carthage, built by Messrs. Alex. Stephen & Sons, Linthouse, are 545 ft. long, with a gross tonnage of 14,500 tons. They have accommodation for 180 first and 200 second class passengers, and are propelled by twin sets of single-reduction geared turbines developing 15,000 s.h.p., which take steam at a working pressure of 400 lb. per sq. in. and 725 deg. F. temperature from Yarrow five-drum water-tube boilers. Unlike the two larger ships, they have the customary black hulls and two funnels painted black, but white upper works. (Plate facing p. 176.)

A Luxury Liner.

The Monarch of Bermuda (plate facing p. 168), launched by Messrs. Vickers-Armstrongs at Newcastle on March 17, was completed in October for the service between New York and Bermuda, maintained by the Bermuda and West India Steamship Company, Hamilton, Bermuda, a company associated with Messrs. Furness, Withy & Co. One of the luxury type of vessels, she has also been designed for long ocean cruises. She is 576 ft. long and has a gross tonnage of about 22,500 tons. Accommodation is provided for 830 first-class passengers and thirty second-class passengers. Each first-class state-room has its own bathroom. The public rooms have been decorated in lavish style, and there is a covered dancing space measuring 100 ft. by 80 ft., with three verandah cafés. There is a lower swimming bath on G deck, and an open-air swimming bath with gymnasium adjacent to the dancing space. The vessel is turbo-electrically propelled. The machinery, supplied by the General Electric Company, consists of two turbo-alternators of 7,500 kw., each supplying power to four motors each driving a propeller shaft at 150 r.p.m. and developing 4,650 h.p. Steam is provided by Babcock & Wilcox high-pressure water-tube boilers working at 400 lb. per sq. in. and a temperature of 670 deg. F. A sister ship, to be built

by Messrs. Vickers-Armstrongs at Barrow, was ordered in December, in consequence of the burning of the Bermuda, employed on the same service, while being refitted at Belfast after a previous fire.

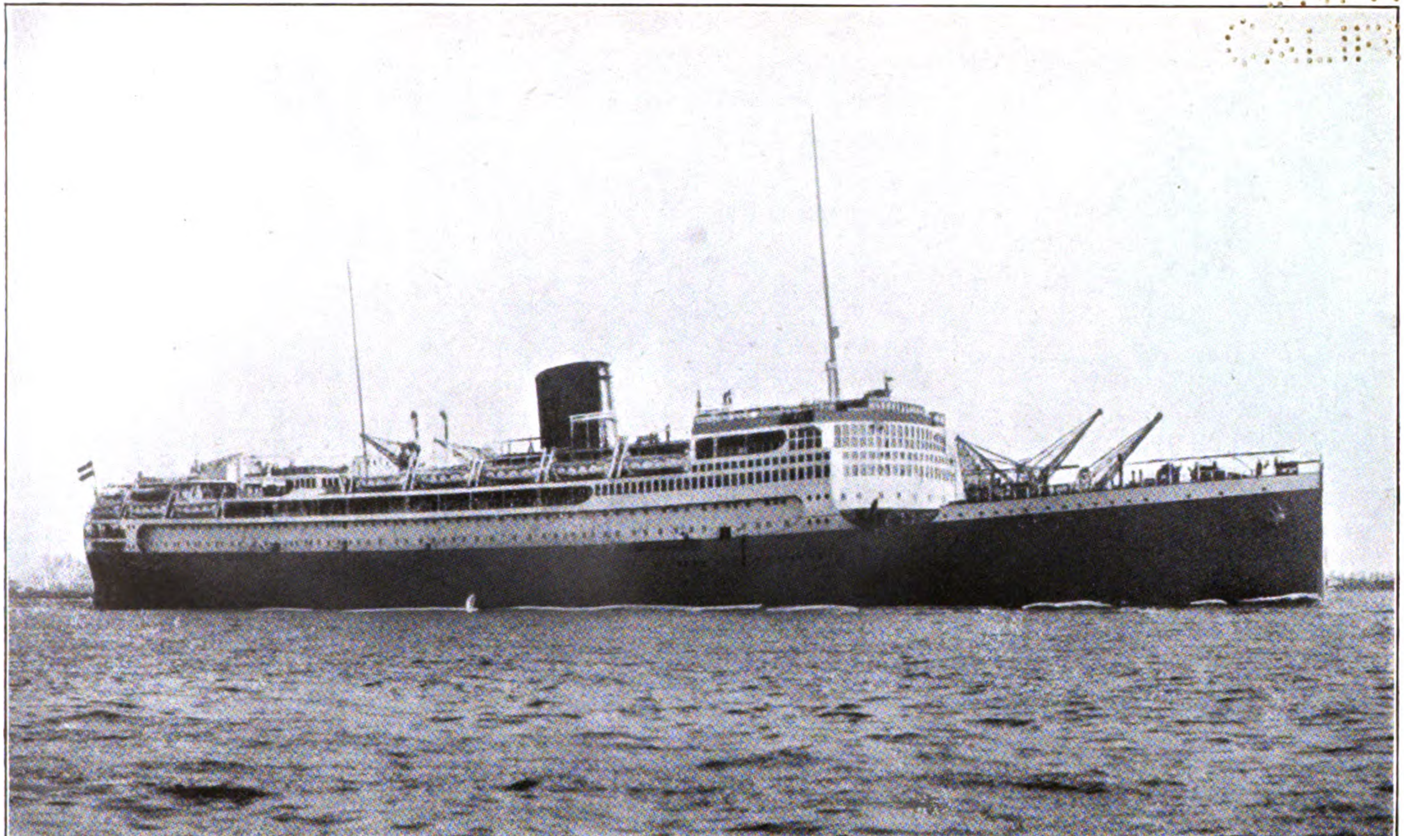
Large Motorships.

A new standard in South American travel was set by the Pacific Steam Navigation Company in placing on service the quadruple-screw motorship Reina del Pacifico, the most powerful British-built motorship, and also fitted with the largest installation of trunk-piston Diesel engines. Built and engined by Messrs. Harland & Wolff at Belfast for service between Liverpool and the West Coast of South America, the Reina del Pacifico is 550 ft. long and has a gross tonnage of 17,300 tons. There is accommodation for 880 passengers. On trials she exceeded 20 knots, and she is now the largest and fastest in the mail service on this route. Very free scope was given the designers of the public rooms, who adapted the Spanish work of the Moresque and Colonial periods. The propelling machinery consists of four 12-cylinder four-stroke trunk piston airless injection Harland-Burmeister & Wain engines with superchargers. Each develops 5,500 b.h.p. at 145 r.p.m. (Plate facing p. 184.)

The Warwick Castle, which entered the Southampton—South African service of the Union-Castle Line, is the largest of the series of five motorships which, beginning with the Carnarvon Castle, have been added to the company's fleet since 1926. Although similar in many respects to the Winchester Castle, built in 1930 and described last year, she is about 20 ft. longer, and the scheme of decoration is different. A vessel 650 ft. long with a gross tonnage of 20,445 tons, she has accommodation for 750 passengers, in first, second, and third class, and mostly in single and two berth rooms. She was built and engined by Messrs. Harland & Wolff. Her machinery consists of two eight-cylinder Harland-Burmeister & Wain engines, giving a speed of about 17 knots.

The Worcestershire, the latest of the Bibby Line motorships, was built and engined by the Fairfield Shipbuilding and Engineering Company, Govan, for her owners' passenger and cargo service between Liverpool and India and Burma. She is 502 ft. long, with a gross tonnage of 10,800 tons. The accommodation, first class only, is on the four upper decks amidships, and state-rooms are arranged on the well-known Bibby tandem principle, with a porthole for each cabin. There are cot beds throughout the accommodation. A service speed of 16 knots is maintained with two sets of Fairfield-Sulzer eight-cylinder engines.

The Dempo, built at the Royal de Schelde Yard, Flushing, for the Rotterdam—Dutch East Indies service of the Rotterdam Lloyd, is a motorship with several interesting features, one of the most striking being her appearance with a superstructure two decks high. In other words, there appears to the observer to be a promenade deck missing between B and D decks, which, indeed, is the case. This superstructure rises from and above the main strength deck to the promenade deck over nearly two-thirds of the length of the ship.



ROTTERDAM LLOYD'S M.S. DEMPO.

(Builders, Royal de Schelde Company, Flushing.)

The main and promenade decks extend over the normal breadth of the ship. The bridge deck, however, does not extend across the full width, but only between the superstructure house walls. Consequently, there is no promenade of any sort on this deck abreast this high deck-house 366 ft. long and 17 ft. 3 in. high. It is one of the first examples of a deliberate stepping back of a superstructure which contains the whole of the principal passenger accommodation of the vessel, while at the same time incorporating the superstructure definitely within the strength hull. The superstructure side plating is consequently of somewhat lighter construction than the main hull. No expansion joints are fitted, and on account of the various stresses which will be set up the edges of all the deck-house windows and door openings are carefully rounded off at the corners. The Dempo is 574 ft. long, with a gross tonnage of 17,000 tons. There is accommodation for 232 first, 278 second, 70 third, and 48 fourth class passengers in addition to troops and servants. The open-air swimming bath, 19 ft. 6 in. by 26 ft., is peculiarly situated on the forecastle. Practically all the passenger beds and bunks are athwartships, and there are many bathrooms which can be hired by passengers for their exclusive use. The Dempo is propelled by two sets of de Schelde-Sulzer engines, developing a total of 14,000 s.h.p. at 102 r.p.m. and giving a service speed of 18½ knots. (Plate opposite.)

The Fastest Motorships.

Two claims to the fastest motorship were made during the year. The first was by the Venus, built at the Elsinore shipyard and engined by Messrs. Burmeister & Wain, Copenhagen. She entered the service of the B. & N. Line between Bergen and Newcastle, which in recent years has been carried on with the Leda and Jupiter, steamships of about 2,500 gross tons each and 15–16 knots speed, and was designed to supplant these two ships. In order to do so she has to make the passage in 21 hours, leaving the Tyne on Tuesdays and Saturdays at 8 o'clock in the evening, and arrving at Bergen at 5 o'clock the following afternoon. This schedule, which has to be maintained in heavy North Sea weather during the winter, called for a vessel with a sea speed of about 19 knots, and on her maiden voyage the Venus averaged nearly 20 knots, arriving half an hour ahead of her schedule. She is 412 ft. 10 in. long overall, and has a gross tonnage of 5,407 tons, carrying 2,400 tons of cargo (210,000 cu. ft. for refrigerated produce) on a draught of 20 ft. These dimensions, which make her twice as large as her predecessors, also ensure that she will ride most seas comfortably. In addition, an easy motion is secured by careful water ballasting arrangements, including the provision of tanks fairly high up in the vessel. There is accommodation for 263 passengers, 185 first class and 78 second class. The 84 single-berth cabins follow in general the same style as the company's Stella Polaris, in which each cabin is fitted with bedsteads and marble wash basins with running hot and cold water. The promenade deck is well glazed at the forward end, and this glazed portion can be shut off by doors from the open deck, a point

appreciated by passengers in cold winter weather. The propelling machinery consists of two four-stroke cycle trunk piston Diesel engines, each with ten cylinders and developing 5,000 b.h.p., or 6,200 i.h.p., at 160 r.p.m. The normal service power is about 4,400 b.h.p. per engine at 150 r.p.m. Supercharging is employed.

Altogether the Venus is an exceptional vessel for a service such as that on which she runs. Her claim to be the fastest motorship was, however, short-lived, for within three months the Lloyd Triestino put in service the quadruple-screw motorship Victoria, which on trials attained 23¼ knots. The Victoria was built and engined by the Cantieri Riuniti dell' Adriatico, Trieste, for the Trieste—Alexandria service of her owners, and is the largest vessel operating in the Mediterranean and Adriatic service. She is 531 ft. long, with a gross tonnage of 13,500 tons. Her block co-efficient of 0·58 compares well with that of the Venus, which is 0·57. Luxurious accommodation is provided for 237 first, 145 second, 100 third, and 40 fourth class passengers. The first-class cabins are very spacious, and each has a private bathroom. The ten *de luxe* cabins, in five groups of two each, are amidships. Every apartment has its own bathroom, in polychromic ceramic, and a large room with two cupboards and sofa. Each cupboard hides a bed, and in the niche there is also the electric light setting and night table. The sofa can be converted into a bed. The *de luxe* apartments are in pairs, divided by a wooden bulkhead, which can be removed, so that for a large family the inter-communicating cabins form a spacious suite with four or even six beds. The sitting rooms can also be isolated by closing a movable wooden partition. The propelling machinery consists of four Sulzer-type engines, which were the first Sulzer engines to be built by the Cantieri Riuniti dell' Adriatico. Their combined service output is 17,000 b.h.p. at 130 r.p.m., although the maximum power with super-charging exceeds 20,000 b.h.p. Two main engines and two auxiliary engines are placed in each of the two main engine-rooms. This arrangement will enable the ship to maintain a speed of 16 knots with all the essential services in use, even should one engine-room be disabled.

French Liners.

Some noteworthy ships have been built in France. The quad-ruple-screw steamship L'Atlantique (plate facing p. 122), built by the Chantiers et Ateliers de Saint-Nazaire Penhoët for the Cie. de Navigation Sud-Atlantique, began her maiden voyage at the end of September. With a length of 733 ft. and a gross tonnage of nearly 41,000 tons, she is easily the largest vessel engaged in the service between Europe and Brazil and the River Plate. Because of the shallowness of the Rivers Gironde and Plate, which she must use, considerable departure was made from the customary dimensions. Thus she has a beam of no less than 92 ft. Those who have travelled in her also comment upon her remarkable steadiness in a heavy sea. This exceptional width has enabled the designers to provide high superstructure decks and to give an imposing appearance to the public rooms. For a similar reason many of the first-class cabins

open on a wide central avenue, to which the term *rue* (street) has been applied. The sports deck is unusually spacious, and there is a special promenade for sunbathers. There is accommodation for 488 first-class, 88 second-class, and 662 third-class passengers. L'Atlantique has a handsome appearance, with three funnels; in the break between the second and third funnels provision has been made for a tennis court. All cabins, both first and second class, are porthole cabins. There are many *de luxe* suites, and also *grand luxe* suites, which, in addition to private lounge and dining-room and full valet facilities, have their own private verandahs. Instead of being low down in the ship, the dining-saloon is as high as C deck, with a balcony above. A special arrangement has been adopted to avoid the large number of drainage outlets common to most ships, the whole of the discharge waste water being collected in tanks and expelled by air ejectors working at about 60 lb. pressure. The propelling machinery consists of four sets of Parsons turbines driving the propeller shafts through single-reduction gearing. Each set comprises one high-pressure, one intermediate-pressure, and two low-pressure turbines, direct coupled to one large gearwheel. There are 16 double-ended oil-burning Scotch boilers working at 227 lb. per sq. in., the steam being superheated to about 650 deg. F.

The cabin-class liner Champlain, for the North Atlantic service of the Cie. Générale Transatlantique, was launched on August 15 from the Penhoët Shipyard at St.-Nazaire. She is somewhat similar to, but larger than, the motorship Lafayette, built at St.-Nazaire rather more than a year ago. She is, however, steam driven. With a length of 640 ft. and a gross tonnage of 26,000 tons, she has an exceptional appearance, with one peculiarly shaped funnel specially designed to prevent fumes and smoke from blowing down on the decks. This trouble, indeed, has been very prevalent in recent years, especially with some of the now fashionable shorter funnels. The top part of the funnel of the Champlain is cut away aft in a manner not unlike that adopted in modern high-speed locomotive practice, and there is a series of baffle plates designed to throw the smoke well up. The promenade deck is sheltered by plate glass windows for more than three quarters of its length. Accommodation is provided for 645 cabin, 131 intermediate, 185 tourist, and 131 third class passengers. Propulsion is by Parsons single-reduction geared turbines, steam being supplied by six Penhoët water-tube boilers and two Scotch boilers. The water-tube boilers will have a working pressure of about 400 lb. per sq. in. The Champlain will enter the Havre—New York service next May.

The Colombie, built at Dunkirk for the Central American service of the Cie. Générale Transatlantique, is 498 ft. long, with a gross tonnage of 11,600 tons. She is the fastest placed by the C.G.T. on the run between Havre and the West Indies and Gulf ports to Cristobal. She was launched practically completed in accordance with the practice of her builders, the Ateliers and Chantiers de France. Accommodation is provided for 491 passengers, 201 first class (including 18 *de luxe*), 72 second, 74 intermediate, and 144 third class. She also has a special sanitary discharge system, all effluents

being delivered to two collectors, one each on port and starboard, which extend the full length of the ship. Two sets of single-reduction geared turbines, developing a total of 8,000 s.h.p. at 120 r.p.m., give a service speed of 16 knots.

The Georges Philippar is a motor ship built at the Loire shipyard for the Messageries Maritimes. She is about 550 ft. long, and of nearly 17,000 tons gross. Two Sulzer engines, each developing 5,500 b.h.p. at 105 r.p.m. give her a speed of 17 knots. Accommodation is provided for 193 first, 131 second, and 102 third class passengers.

For their Marseilles—Morocco—Senegal service, the Cie. Paquet put in service the Djenne, a vessel 444 ft. long and of 8,790 gross tons. She is the first turbine-driven vessel in her owners' fleet, and at 18 knots is 1½ knots faster than any other of their ships. She will cut down the passage from Marseilles to Dakar *via* Tangier and Casablanca to seven days. There is accommodation for 151 first, 148 second, and 136 third class passengers, with several *de luxe* suites. Two sets of single-reduction geared turbines develop 8,000 s.h.p. at 125 r.p.m. Steam is derived from six oil-fired Prudhon-Capus boilers. She was built at the Mediterranée shipyard.

Miscellaneous Vessels.

Unlike her namesake, which provided one of the sensations of 1930, the Europa, for the O.K. Line, operating in the Pacific, of the East Asiatic Company, is a motorship, of 10,400 gross tons. She is similar to the Amerika, also built by Messrs. Burmeister & Wain, Copenhagen, at the beginning of the previous year, but has increased passenger accommodation, larger refrigerating plant for dealing with fruit cargoes, and special tanks for the carriage of about 1,200 tons of soya-bean oil. She is one of the largest single-screw motorships in the world, with a deadweight capacity of 12,000 tons. Accommodation is provided for 56 first-class passengers.

The Monte Pascoal is a twin-screw passenger and cargo motorship of about 14,000 gross tons for the service of the Hamburg—South American Line. Built by Messrs. Blohm & Voss at Hamburg, with Diesel engines giving a speed of about 14 knots, she entered service at the beginning of the year, and was followed later by the Monte Rosa.

Two interesting motorships were built by the Netherland Shipbuilding Company, Amsterdam, for the Java—China—Japan service. These were the Tjinegara and Tjisadane, vessels of about 12½ knots service speed, 458 ft. long, about 9,300 gross tons and 16,150 tons load displacement on 29 ft. draught. There is accommodation for 40 first, 42 second, and 90 third class passengers. They are single-screw ships propelled by Werkspoor engines.

Towards the end of January the cargo motorship Otaio, 490 ft. long, 10,048 gross tons, 12,300 deadweight tons, was built by Messrs. Vickers-Armstrongs for the New Zealand Shipping Company. Two sister ships have now followed; they are the Opawa and Orari from the Linthouse shipyard of Messrs. Alexander Stephen & Sons. Both have Sulzer-type engines, one built at the builders and the other

at Winterthur, and they give the ships a speed of about 15¾ knots. Each has more than 425.000 cu. ft. of insulated space.

An interesting series of six cargo steamers was turned out by Messrs. Harland and Wolff at Belfast for the Cie. Générale Transatlantique. These are the San Antonio, San Diego, San Francisco, San José, San Matteo, and San Pedro. They are vessels 430 ft. long, with a gross tonnage of about 5,990 tons, and carry about 8,420 tons deadweight. Intended mainly for their owners' Pacific cargo services, they also have accommodation for a few passengers. Four-cylinder triple-expansion engines with oil-fired Scotch boilers develop about 4,800 i.h.p. The San Pedro has a Bauer-Wach exhaust turbine.

In these days the construction of a new vessel with a real clipper bow, well raked masts, and a yacht-like appearance deserves notice, especially as the ship in question, the St. Sunniva, is mainly for the utilitarian trade connecting the Orkneys and Shetlands with the mainland. Rigged like a two-masted schooner, the St. Sunniva, built by Messrs. Hall, Russell & Co., Aberdeen, for the North of Scotland & Orkney & Shetland Steam Navigation Company, reproduces purposely some of the features of the old St. Sunniva, which was designed and constructed in 1887 as a pioneer of the Norwegian Fjord business, put on the company's general trade in 1908, and lost by running aground in a fog in 1930. The new vessel is 240 ft. long, with a gross tonnage of 1,100 tons, and carries 380 passengers, first and second class. She is specially equipped for the carriage of cattle and sheep, which at certain times of the year, mainly when the passenger business is quiet, form an important section of the trade on this route. Triple-expansion steam engines give a speed of about 15 knots. (Plate facing p. 160.)

Two typical whaling factory vessels are the Vestfold and Svend Foyne, 550 ft. long, with a deadweight capacity of about 22,600 tons. They are the largest ships built on the Tees, and were constructed by the Furness Shipbuilding Company, Haverton Hill, for Norwegian owners, the Sydhavet Company, Sandefjord. Each vessel has large oil cargo compartments and a specially designed oak-sheathed skidway opening through the cruiser stern for hauling whale carcases up to the flensing deck. The blubber, meat, and bones are all treated aboard, high-pressure boilers and extraction apparatus being employed in the processes. Wireless has been installed ample for the maintenance of communication with Norway while the ships are operating in South Polar waters. They are to be away for about ten months at a time, and provide extensive accommodation for the ships' personnel, the factory hands, catchers, gunners, and so on. Two sets of quadruple-expansion steam engines take steam from five large single-ended boilers working at 265 lb. per sq. in.

A.M.I.N.A.

CHAPTER XIX.

On the Bridge of a Liner.

Since the adoption of iron, and subsequently steel, as the material for vessels of all types, and the introduction of mechanical propulsion, there have been amazing changes in the methods of building ships, and development has taken place with such rapidity as to be almost unbelievable. Yet as ship after ship was launched, of increasing size and speed, and embodying all the latest results of scientific research in their construction, the instruments which had been used for years to navigate vessels safely in the oceans of the world changed but little, and only in comparatively recent years has safety at sea, from the navigational point of view, developed to any marked degree. To-day the bridge of a modern first-class liner is provided with such " gadgets " as gyro-compass, pilot and course corrector, echo sounding machine, wireless direction-finding gear, submarine direction indicator, patent fire alarm indicator, electric engine-room telegraphs, telephones, watertight door controls, electrically controlled clocks, revolution indicators, and other devices; and every year witnesses the birth of new scientific aids to make navigation as " fool proof " as possible.

Position Finding.

The first indications of the necessity of " speeding up " navigation became apparent on the increase of the speed of ships. In the days of full-rigged ships, when an average day's run rarely exceeded 140 nautical miles, the sun was—except in a very few cases—the only heavenly body used to determine a vessel's position. All that was required was a sextant (simply a reflecting instrument, used to observe the angle of the sun above the horizon) which made it possible to calculate the time at the ship, and this on comparison with the time at Greenwich (ascertained from a chronometer or clock) gave the angle East or West of that meridian, or in other words, the longitude. The use of the same sextant at noon gave the latitude, which, with the longitude, fixed the vessel's position anywhere on the waters of the earth. It is a remarkable fact that, save for a few minor improvements, the same instruments and the same methods are used to-day in the merchant navies of the world. The sextant has indeed been improved by the provision of better and larger telescopes and mirrors, special star telescopes, etc., but only in the last few years has the old-fashioned and out-of-date method of reading the Vernier by a magnifying glass been superseded by the micrometer. This fitting,

which practically eliminates the old fault of "misreading the sextant," together with an "endless tangent" screw, makes the modern sextant an exceedingly easy instrument to manipulate.

The chronometer (which is simply a well-made clock compensated for changes of temperature) is still fundamentally the same instrument, but the human element of forgetfulness has been eliminated with the introduction of electrical winding.

The introduction of stellar navigation into the examinations of Masters and Mates for Certificates of Competency has taught the navigator additional methods for finding the vessel's position. The sextant and chronometer, together with the Nautical Almanac (giving the positions of the heavenly bodies) and modern Nautical Tables, are all that the vast majority of officers of merchant vessels have to assist them to navigate their ships.

Compasses.

It will be realised that it is of little use for the navigator to be able to fix the vessel's position at frequent intervals if an accurate course cannot then be steered to any desired position, so that the only instrument by which he can find his way across the open waters —the compass—has obviously increased in importance with the increase in size and speed of ships.

The mariner's or magnetic compass is in use in all sea-going vessels to-day, as it was a century ago, but the modern instrument is enormously improved, and the error due to the effect of iron in the ship (deviation) is now practically non-existent. The directive force of the compass needle has also reached a marked degree of efficiency in the modern compass, and the smallest amount of movement of the ship's head from the course line is instantly detected on the compass card. This high sensitiveness in directive force of the compass has been the result of much scientific research. As a consequence of the great improvements that have been made in the magnetic compass, mostly by Lord Kelvin, it is possible to steer to a degree (i.e. 1/360th of a circle), and the helmsman is now ordered to steer, e.g. N. 28 deg. E., the more picturesque N.E. by N.½N. of the sailing ship having gone for good in deep-water steamers.

Undoubtedly the outstanding development of the compass in recent years is the gyro-compass, which is not governed in any way by the earth's magnetism. It consists of a heavy wheel, known as the sensitive element, which by electrical means is made to rotate at a very high speed—8,600 revolutions a minute in a Sperry compass, and at a much greater velocity in a Brown or Anschütz compass (three of the best-known makes). This wheel is mounted so as to have "three degrees of freedom." First, the wheel's axis is suspended in bearings in a ring which gives it freedom of rotation about a spinning axis; this is known as the "first degree of freedom." This ring, bearing the sensitive element, is suspended in a half-ring which gives it freedom about a horizontal axis, which is the "second degree of freedom." Finally, the half-ring is mounted in a pivot on a stand which gives it freedom about a vertical axis. This is

the "third degree of freedom." The wheel, mounted in this manner, has the ability when revolving at a high speed of maintaining its direction in space irrespective of the direction to which the stand is diverted, and it has thus become possible (in conjunction with the force of gravity) to make the axis of the spinning wheel take up a position parallel to that of the earth's polar axis.

The gyro-compass itself is usually fitted in some secluded part of the ship, where it will be least subject to disturbance by vibration or other causes. Electrically connected compass dial repeaters to the gyro-compass are placed in various parts of the ship, such as on the bridge for steering or taking bearings, in the charthouse, or in the wireless room. These repeaters must all be lined up with the master compass before leaving port, a small screw for this purpose being placed at the back of the repeater, by which the compass dial can be turned to point in the same direction as the card of the master compass.

The gyro-compass has a number of important advantages over the magnetic compass. It is unaffected by magnetic disturbances; the north point of the compass card points in the direction of the true meridian; its directive force is infinitely more powerful than that of the magnetic needle, and therefore a truer course can be steered; and repeaters can be placed in any part of the ship from the one master compass. On the other hand, it is liable to possible mechanical defects, which would upset its directive force, and therefore in vessels fitted with a gyro-compass it is necessary to carry also a magnetic compass. Further, it is costly to buy and install, but nevertheless it is becoming a more and more common practice to fit an instrument of the kind in modern liners.

Gyro-Pilot.

The gyroscope has not found its only use in the gyro-compass, but has also been utilised to aid navigation in other ways, as in the gyro-pilot, course corrector, and course recorder.

The introduction of the gyro-pilot has been the means of dispensing with the services of a quartermaster at the wheel. This device, when connected up with the steering wheel, automatically steers the ship. The bridge part of the pilot consists of a small motor, controlled and operated from the master gyro-compass, which operates, by means of contact mechanism clapper switches, that part of the apparatus which is in the power steering gear-room, and this part in turn operates by means of switches the movements of a small electric motor, which controls the steering engine. In this manner a course can be set on the bridge and maintained by the gyro-pilot more accurately than was ever previously possible when steering by hand, inasmuch as the necessary opposite helm, in compliance with the movement of the gyro-compass indicator, is put on, to meet the vessel's head when deviating from her course, more readily than could be done by a quartermaster at the wheel. Experiments have been carried out with the use of a chart, on which an indicator plots the amount of deviation of the

NAVIGATION BRIDGE OF P. & O. LINER STRATHNAVER.

ship's head from her course line both by gyro-pilot and by hand-steering with magnetic compass, and the results have shown that even under the most adverse conditions of weather the gyro-pilot steering has been nearly 100 per cent. more efficient.

The course-recorder consists of a small box-like container, usually screwed to a bulkhead of the charthouse or placed in some convenient position on the bridge. A section of the container has a glass face through which can be seen a revolving chart strip on which the ship's course is accurately recorded in ink. This is done by an electrical connection with the master gyro-compass, and so great is the directive power of the compass that an alteration of course can be recorded to one-sixth of a degree. In this manner a permanent record can be kept of the ship's course on a voyage, and such a record, which is carefully maintained in conjunction with the time by the ship's clock, should be of special value in a court of inquiry in the event of collision or other accident.

Sounding.

Fog is the greatest menace to the seaman, as when he is in coastal waters, in addition to the risk of collision, the danger of being "set ashore" by the tidal stream is an ever-present anxiety. In these circumstances the vessel has to be navigated by "soundings," a line of which is started when she approaches land in fog and is maintained until the fog lifts. Before the introduction of Lord Kelvin's sounding machine (which is extensively fitted in ships to-day) it was necessary when making a sounding to stop the ship and take a cast with the deep-sea lead by hand—a slow and tedious procedure. The first-class liner now generally carries two of these machines, usually placed one on each side immediately under the navigating bridge. They are frequently motor-driven, and naturally this is a better arrangement than working them by hand, as the line and sinker can be rapidly "hove in" after taking a sounding. By the alternate use of the two machines frequent records can be obtained of the depth of water and the sea bed.

The depth is actually recorded by means of a chemically prepared glass tube, hermetically sealed at one end and open at the other. This tube is placed, open end downwards, in a brass container which is secured to the lead line just above the lead. As the sinker falls to the bottom, the water pressure increases and, compressing the air above it, the water rises in the tube to a level corresponding to the sea pressure at that depth. The salt water causes a chemical action, changing the chromate of silver coating of the tube to chloride of silver, which leaves a distinct discoloration to the level to which it has risen in the tube. On heaving in the lead the glass in the tube is taken and applied to a boxwood scale, from which the depth of water is at once read.

A book of speed and depth tables is supplied with the machine, by which a check can be kept on the depth recorded by the glass tube. The amount of wire run out in the course of taking a sounding is read off on the dial attached to the sounding machine, and

this known quantity, together with the speed of the ship over the ground, gives the trigonometrical value of the perpendicular of a plane right-angled triangle, which represents the depth of water. This, however, is only a check on the glass tube reading, and is not sufficiently accurate in itself.

An entirely new departure in the system of taking soundings has been made by the introduction of the echo-sounding machine. This device is the very latest method of determining the depth of water under a vessel. It enables depths to be ascertained within a second or so of taking the sounding, and consequently is a marked improvement on the old method of sounding by lead, as many more soundings can be recorded in the same space of time. In the echo sounder, which is being installed in most large vessels to-day, the method of ascertaining the depths depends on the period of time required for a sound, sent out by a transmitter on one side of a ship, to reach the sea bottom and for its echo to be reflected back again to a receiver on the other side of the ship. The sound thus travels a distance approximately twice the depth of the water, both transmitter and receiver being below the water line. In the British Admiralty echo-sounding system the transmitter is fitted in the hull of the ship, and consists of a diaphragm of steel, usually about 5 in. in diameter, which by a spring hammer is caused to vibrate at a frequency of 1250 a second. The result of an observation is determined by the time taken for a sound to complete the circuit; this period is converted into fathoms or feet on the instrument by means of reduction gearing. There are several echo-sounding systems on the market, and it is obvious that this means of ascertaining the depth of water under a ship is destined to become universally employed, as it practically removes the greatest danger with which the navigator has to contend in these days of fast-moving vessels.

Watertight Doors.

Since the Titanic disaster great efforts have been made to improve watertight-door controls. All watertight doors in large ships can be controlled from the bridge by the officer on watch, and it is a standing order in most ships that all watertight doors are to be closed by him in fog or in dangerous waters. An elaborate plan of the vessel's watertight-door system is usually fitted in the charthouse or wheelhouse, with miniature electric lamps which indicate the positions of the doors, and whether they are closed or not, so that he can at once see which doors are closed and which are open.

The Stone Lloyd system is a good example of the method of watertight-door control, as all the doors are operated hydraulically, and can all be closed simultaneously by operating the bridge control gear, an indicator moving until they are closed. The whole operation can be carried out in a few seconds. In case the hydraulic system fails at any of the doors, a float lifts on the water entering the compartment, thus automatically closing the door. Warning of the closing of the doors is given by a bell. Another feature of

this system is that the doors can be opened locally, and automatically close again after being opened.

Submarine Signalling.

A glance at a chart of the British Isles will show that most of the principal light vessels are fitted with submarine bells, by which fog signals are sent out at regular intervals. Sound travels 4,700 ft. a second in water, roughly four times faster than through air, and its passage through water is not affected, as it is through air, by atmospheric conditions. In thick weather the signal sent out by a light vessel's submarine bell can be picked up by a vessel provided with a submarine direction indicator. Inside the hull on the bow small tanks are fitted to which the water has free access from outside the ship. The tanks contain microphones, usually two in each, and each microphone works independently of the other, so that one is available in the event of the other happening to be defective. They are connected by wires to the direction indicator box on the bridge, and this box has a lever which can be turned to connect either port or starboard microphones with the earphones. On picking up a submarine signal, the vessel is manœuvred until the sound signal is of the same volume in each earphone, when the light vessel should be situated in the direction in which the vessel is heading. These bell signals can be picked up clearly by a vessel within a radius of 20 miles.

Light vessels are now, however, being fitted with the Fessenden oscillator, which is very similar to that used in submarines for underwater signalling. The oscillator is sounded by an electrical apparatus inducing a very high frequency, and by this device the radius of the sound waves is increased to well over 70 miles.

Submarine bells are now often provided which can be hung over a ship's side and sounded to enable other vessels to locate her position in the event of an accident, and so proceed to her assistance.

Fire Detection.

From time immemorial fire at sea has been the cause of terrifying disasters ; but in a liner to-day it is practically impossible for fire to remain undetected for long, because of the installation of automatic fire indicators and alarms. There are many varieties of these all-important instruments. In the first place, any compartment below the water line which is on fire can be automatically isolated from the rest of the ship immediately an alarm is given by closing the watertight doors from the bridge. On the decks above the watertight compartments fire-proof doors and fire screens are fitted. Some vessels are provided with electrical instruments in which the electric circuit is maintained in the various compartments by means of a special fuse connection. On the temperature in any particular compartment rising above a certain point, the blowing of the fuse causes a bell to ring on the bridge, and the officer on watch can, on

inspecting the automatic alarm system, see in what part of the ship the fire has originated.

An ingenious system to indicate the presence of fire in a vessel's hold is the Rich indicator. A pipe is carried from each hold to the bridge, through which strong currents of air are drawn by powerful fans. Thus, any smoke accumulating in the hold can be immediately detected by the condition of the air drawn from the hold, which is shown by an indicator. Controls for releasing steam from pipes into the hold can be immediately operated from the bridge on the least sign of the presence of smoke.

Whistle Control.

The Rule of the Road for preventing collisions at sea stipulates that there must be certain periods of time between the blasts of the ship's whistle during fog. In an up-to-date ship under way in thick weather, the whistle, by an electrical timing device, is sounded automatically at the required periods. The officer of the watch has merely to turn a switch, when the signals will be sounded regularly until they are stopped. In this manner not only will the whistle be sounded at the exact times, but the navigator will not have his attention diverted from the principal duty of keeping a good look-out by having to pull the whistle lanyard.

Another indicator gives an alarm in the event of the failure of any of the mast-head or side navigational lights.

Telegraphs and Telephones.

Many accidents have been caused in the past through the faulty transmission of engine telegraph signals from the bridge to the engine-room. The modern telegraph has an interlocking device, so that there can be no misunderstanding in the orders given from the bridge.

It is possible with the tacheometer tell-tale (through the medium of pointers) to see the direction in which the propellers are revolving, and also the number of revolutions the engines are making. Each propeller shaft is connected to a separate tacheometer, so that it can be ascertained at a glance whether the engines are responding correctly to the orders delivered through the engine-room telegraphs.

An excellent device fitted in several vessels consists of a control which makes it impossible for the engines to be moved in any direction but that ordered from the bridge. No doubt this obvious safeguard will be fitted in many more vessels in the future.

Electric helm indicators are fitted in all navigational parts of the ship, so that at any time the direction and amount of helm can be observed. This contrivance does away with dangers caused by the failure of some of the "telemotor" gears to hold the pressure, which results in the rudder slowly slipping back to midships when the wheel is still "hard over," obviously a dangerous occurrence.

When communicating with the engine-room, or while docking a large vessel, clear and instantaneous delivery of orders from the bridge is a vital necessity. Orders from the bridge to the poop (or

after docking bridge), fo'c'sle head, and engine-room are now conveyed with every satisfaction through the medium of loud-speaking Navy telephones. The earphones are connected to arm levers, which must be lifted up and applied to the ears, all speech being delivered through a transmitter clearly and loudly. Another advanced feature of some of these instruments is what is known as a "voice call"; by lifting the arms of the side-tube instrument, and speaking into the transmitter, the communication is delivered loudly enough to enable the listener at the other end to hear the speaker without having to approach his phones. These Navy telephones have the additional feature of being completely water-tight, so that their efficiency cannot be impaired by the presence of water in the instrument.

The most recent improvement in the ordinary telephone system of a ship is the installation of the automatic exchange system, which enables a connection to be made with any part of the ship in two or three seconds. These telephones are fitted to the master's, chief engineer's, navigating and engineer officers' rooms, and bridge and engine-room—in fact, wherever an express call may become a necessity. Delays caused by wrong numbers or by waiting for the operator at the exchange to connect up are avoided by this invention, and confidential communication can be carried out as desired.

Electric Clocks.

In the past many difficulties have arisen during courts of inquiry into cases of collision and other accidents by the times in the bridge and engine-room log books differing appreciably from each other. It is desirable, therefore, that all the ship's clocks should keep the same time. This is particularly the case when recording in the log books of the bridge and engine-room the times when different engine movements are carried out, although it is obviously important also from the point of view of ship's routine that the clocks should all show the same time.

Electric clocks are used in all the latest vessels, the master clock (which is usually in duplicate) being installed on the bridge, and its time conveyed to various other clocks about the ship by electrical transmitting gear. The working of this device is most interesting. When sailing westward and the clocks have to be put back, the master clock is put back, say 20 minutes, when every clock in the ship stops for 20 minutes and then automatically goes on again. If sailing eastward, and the clocks have to be put on, the master clock is advanced, say 20 minutes, when all the clocks automatically go "click, click, click" and "clock on" 20 minutes at once. By an ingenious device, the amount which the vessel's clock has to be advanced or retarded each day is altered on the master clocks, and every clock in the ship is automatically corrected.

Patent Logs.

Since the appearance of the first patent log there have been many improvements in its construction. The majority of the ships of the world use Walker's patent logs to measure the distance run; these machines range from the ordinary taffrail log to the electrical transmitting type, by which it is possible to read in the chartroom the distance run—obviously a great boon to the navigator. The distance run is indicated on a dial through the medium of mechanism, put in motion through a rotator which is towed on a line at a suitable distance astern of the vessel. The rotator is fitted with fins set at a particular angle, which as it is drawn through the water cause it to revolve at a number of revolutions corresponding to the rate the ship is going through the water. The mechanism is geared so as to register one nautical mile to a certain number of revolutions made by the rotator.

While this is the instrument used by all vessels, from trawlers to liners, many modern vessels are fitted with a patent log in which the speed indicator is combined with the distance run recorder. Logs of this character are the " Forbes," the " Sal," and the electric submerged log.

The feature of the Forbes log is that the speed is recorded through a small propeller in a tube projecting through the bottom of the ship. The propeller generates a current (by a magnetic generator) at a pressure corresponding to the speed of the vessel. This current is led to a voltmeter, and the speed of the ship is shown by the voltmeter through an attached dial graduated in knots. The distance run is recorded on another dial. Any number of voltmeters can be distributed in various parts of the ship.

In the Sal log, which is a Swedish invention, the speed is indicated on the principle that the dynamic pressure exerted by water is equal to its velocity. The pressure of the water relative to the vessel's forward motion through the water operates a diaphragm; and through mechanism the vessel's speed is registered on a speed indicator.

Rangefinders.

The navigational rangefinder is one of the fittings on the bridge of a big liner, but is hardly a new invention, as rangefinders have been used for many years in the Royal Navy in connection with gunnery. The instrument is of great value in coastwise navigation, since an accurate position can be ascertained with it, in conjunction with a compass bearing of a single shore object. The instrument provides a means of maintaining a safe distance off a headland while it is being rounded, and yet not wasting time and distance, as the safety margin can be reduced to a minimum. As an illustration of the high degree of accuracy obtained in a small rangefinder only 4½ ft. in length, it may be mentioned that an error of only about half a dozen yards is shown in taking the range of an object one nautical mile distant.

The rangefinder is essentially an instrument for automatically

solving a plane right-angled triangle and finding the length of the perpendicular which is the distance off of the object, the instrument itself being the base line. The observer, looking through the right eye-piece of the rangefinder, sees two partial images of the object of which he wishes to ascertain the range. The two parts of the object appear one above the other separated by a thin horizontal line. Thus, should the object be a lighthouse, the upper half appears to be some distance to the right or left of the lower part of the tower. By turning the working head the images can be brought into exact alignment or coincidence, and the range of the object is then read off a revolving scale in the field of the left eye-piece.

Wireless Direction Finding.

Much time has been saved and risk of accidents reduced by the use of wireless direction-finding gear in case of fog. If a vessel is fitted with such gear the navigating officer is able to determine the ship's position by cross bearings taken of different shore wireless stations.

The direction-finding aerial is placed well above the navigating bridge, and the bearings found are surprisingly accurate. Not only can a vessel's position be ascertained in a fog, but also the bearing of other vessels in the vicinity and their relative courses—information which is exactly what is wanted in fog.

The foregoing may serve to illustrate the enormous advances made of recent years in the methods of modern liner navigation and working. Science has proved of the greatest value to the seaman, but it must never be forgotten that navigation is, and must of necessity be, an inexact science, and that all these improvements are of little avail if the human element fails. The "man on the bridge" cannot be expected to be a scientist, as first and foremost he must be a man among men, trained by the sea and the hardships of the sea; but science has nevertheless been, and will continue to be, of the greatest assistance to him.

O. M. Watts.

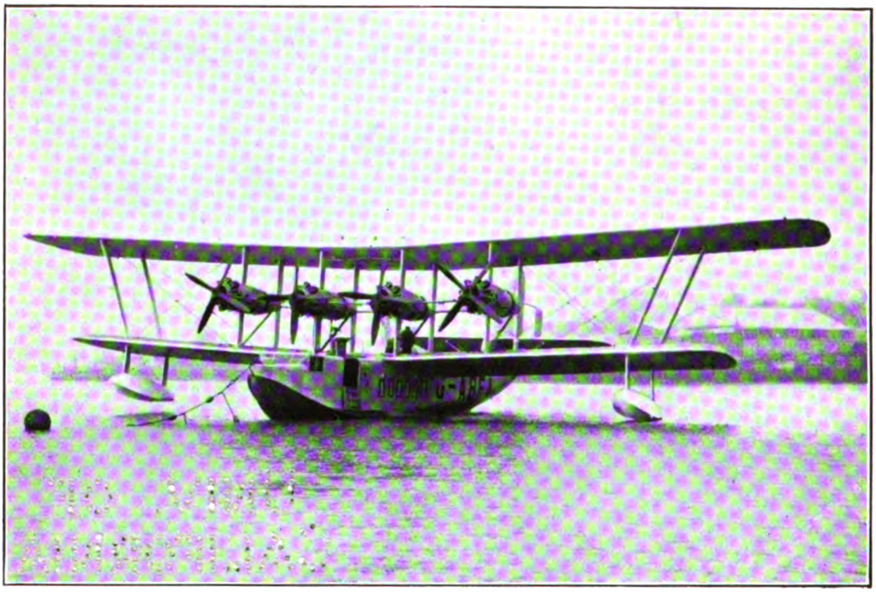
CHAPTER XX.

Commercial Marine Aircraft.

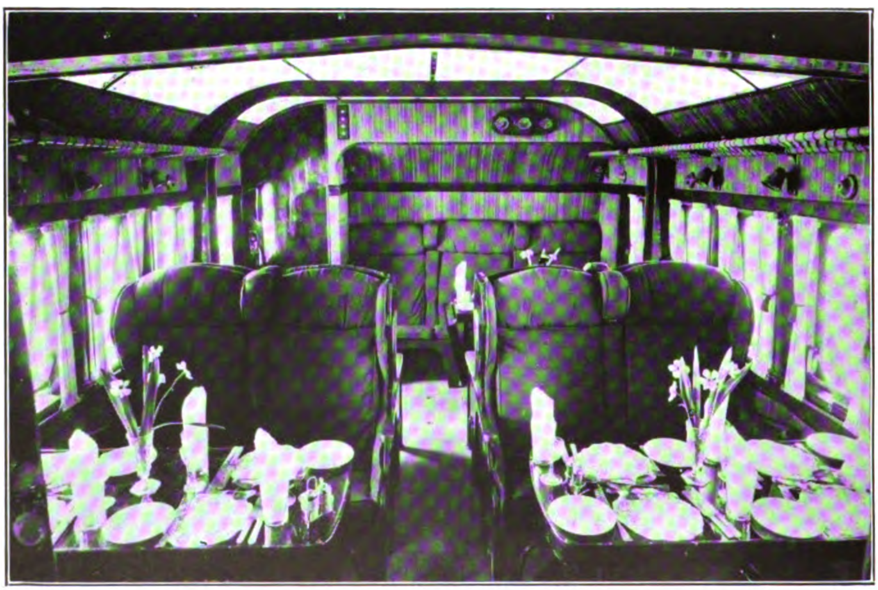
Progress was certainly made in the development of commercial marine aircraft during 1931, but it was in some respects disappointingly slow. New types which it had been hoped to complete and put into operation during the year were delayed by various unforeseen causes, and certain technical and engineering problems which appeared to be nearing solution were found to give rise to others. Nothing happened to give cause for alarm, and the difficulties will undoubtedly be overcome in time, but the delays are a little disappointing to those who hold the view that the marine type of commercial aircraft is Great Britain's future mainstay on the long Empire air routes.

Reference was made in last year's "Annual" to the impetus given to flying boat construction by the introduction of new structural materials, notably rustless steels, and the view was expressed that if these steels were found to fulfil the promises they gave, many of the flying boat designer's problems would be solved for him, or at any rate would be greatly simplified. Unfortunately the amount of experience gained during the past year was insufficient for a very definite conclusion to be reached on this point. By themselves the rustless steels have done what was expected of them. Their resistance to corrosion has fulfilled the high hopes placed upon them, and riveted edges have given no troubles in use. The four-engined "Short" flying boats used on the Mediterranean section of the air routes to India and to Central Africa have their underwater planking made of rustless steel, and it is learned that they have given perfect satisfaction with their anti-corrosion properties.

Until such time as, by the increase in size, it is possible to use rustless steel throughout the structure of a flying boat, another difficulty indirectly due to the characteristics of rustless steels has been encountered during experimental work carried out. It has been found that when, for example, the hull of a flying boat, or at any rate the underwater portion of it, is made of rustless steel, while the small outboard wing tip floats are made of duralumin, an electrolytic action is set up which results in the very rapid corrosion of the duralumin float. The remedy may appear obvious—to make the outboard floats of rustless steel. When flying boats have attained really large size, this may become possible. In such boats as exist to-day it is not economic, from a weight point of view, to make such small shapes as wing tip floats of steel, because the



"KENT" FLYING BOAT.
(*Builders, Messrs. Short Brothers, Rochester.*)



INTERIOR OF "KENT" WITH TABLES LAID FOR LUNCH.

smallest practicable thickness of metal that can be used is too thick and too heavy for the work to be done.

It is not even certain yet that when electrolytic action is going on it will always be the duralumin which is eaten away. Some interesting experiments have been made by a well-known firm of flying boat constructors, in which rustless steel and duralumin plates were used as electrodes in a battery. Sometimes the duralumin plates would be eaten away and sometimes the steel plates, while in other cases both sets of plates suffered. The experiments are still going on, but at the moment no satisfactory and conclusive deductions can be drawn from the results. In the meantime designers are naturally cautious in the manner in which they use the two materials together, and progress is bound to be a little retarded until this and similar problems have been cleared up.

The "Kent" Class.

When the 1931 volume of "Brassey's Annual" was going to press, a new type of flying boat was under construction at the Rochester (Kent) works of Messrs. Short Brothers. At that time the machine, which was intended for Imperial Airways, was commonly referred to as the "Four-engined Calcutta," because of its family resemblance to that famous type. Apart from size, the new machine differed considerably from the "Calcutta," notably in having four instead of three engines, arranged abreast in the gap between the upper and lower planes. Several of these machines were built by Messrs. Short for Imperial Airways, and the type became known as the "Kent" class. Several of these machines have now been in use for many months in the Mediterranean, and they have been found extremely successful. The passengers' comfort is a good deal greater than in any previous aircraft, due partly to the placing of the engines above the flying boat hull instead of laterally out from it as in most multi-engined landplanes, and partly to the relatively large space available inside the hull, which is such as to give, for the first time, really ample space for each passenger. The seats are remarkably comfortable, and the space between them is such as to leave plenty of leg room. The cabin measures 14 feet 9 inches in length and 6 feet 6 inches in height, and is 8 feet 10 inches wide. It has seating accommodation for 15 passengers, the seats being arranged as shown in the plate facing this page, which is a general view looking aft, taken from the passage which leads from cabin to pilots' cockpits. The three forward seats are not included.

The large windows in the sides of the hull contrast with the much smaller windows of the "Calcuttas," and although the cabin is below the lower wings, sufficient light is usually reflected from the various surfaces to ensure that the cabin shall have a light and cheerful appearance. The walls are padded with sound-absorbing material, and the noise which reaches the passengers has been reduced to the point where it is quite possible to carry on a conversation during flight.

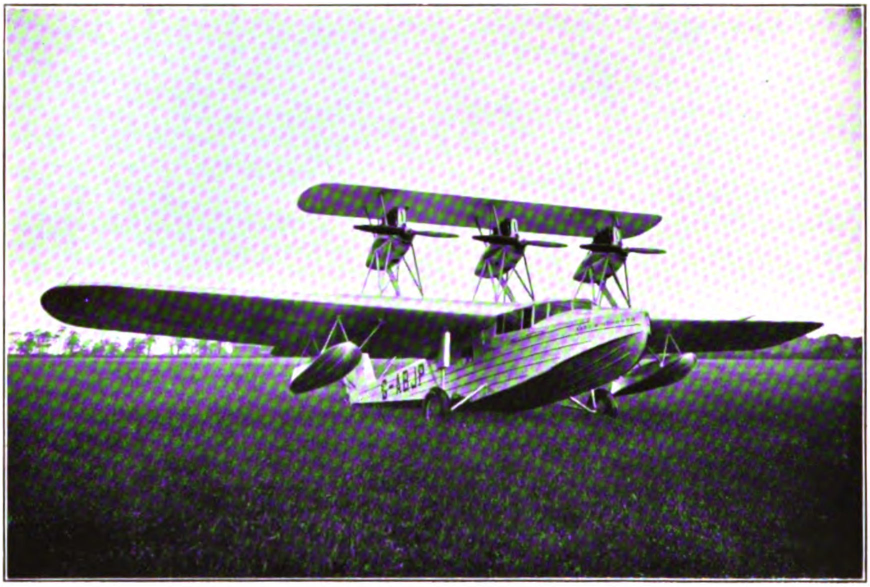
Each of the 15 passengers is permitted 60 lb. of luggage, and in addition to the pay load of 3,375 lb. represented by 15 passengers and their luggage, the "Kent" carries a mail or other pay load of 4,085 lb., which brings the total pay load up to 7,460 lb., which represents nearly $3\frac{1}{2}$ lb. per normal horse-power. This is for a normal cruising range of 450 miles at a cruising speed of 105 miles an hour. The amount of fuel carried for this range is 410 gallons, so that the operational economy of the "Kent" class of flying boat is 1·1 miles per gallon of fuel (assuming that there is no reserve, which as a matter of fact there always is), which, with a pay load of 7,460 lb., corresponds to 8,200 pound-miles per gallon, or 3·66 ton-miles per gallon. This is a very encouraging figure, and if allowance is made for less than the 410 gallons being consumed for the 450 miles' range the figure becomes even better, probably in the neighbourhood of 4 ton-miles per gallon.

The power plant of the "Kent" class comprises four Bristol "Jupiter" engines of 555 b.h.p. each; this power is the normal, and is developed at an engine speed of 2,000 r.p.m. at an altitude of 4,000 feet. This type of engine was chosen because with its airscrew gearing and moderate degree of supercharging it is particularly suitable for use in fairly warm climates. The particular type of "Jupiter" engine used is that known as the X. FBM, the letters indicating the series type which has the "F" type of new cylinder, and is moderately supercharged.

As certain modifications to the weight figures given in last year's "Annual" have been made, it may be well to record the revised figures. The tare weight of the machine is 18,900 lb. This figure refers to the machine stripped of all equipment and furnishing. As the permissible gross weight is 32,000 lb., there is available for disposable load 13,100 lb. This can, of course, be divided into almost any desired proportion of range and pay load, but a representative allocation is that already quoted, i.e. a fuel and oil load (for 450 miles) of 3,420 lb., a crew of three with luggage, or 660 lb., and a pay load of 7,460 lb. It may, perhaps, be of interest to point out that when the machine is equipped for the Mediterranean route, the equipment weight, i.e. weight of instruments, wireless, cabin furnishings, etc., is 1,560 lb.

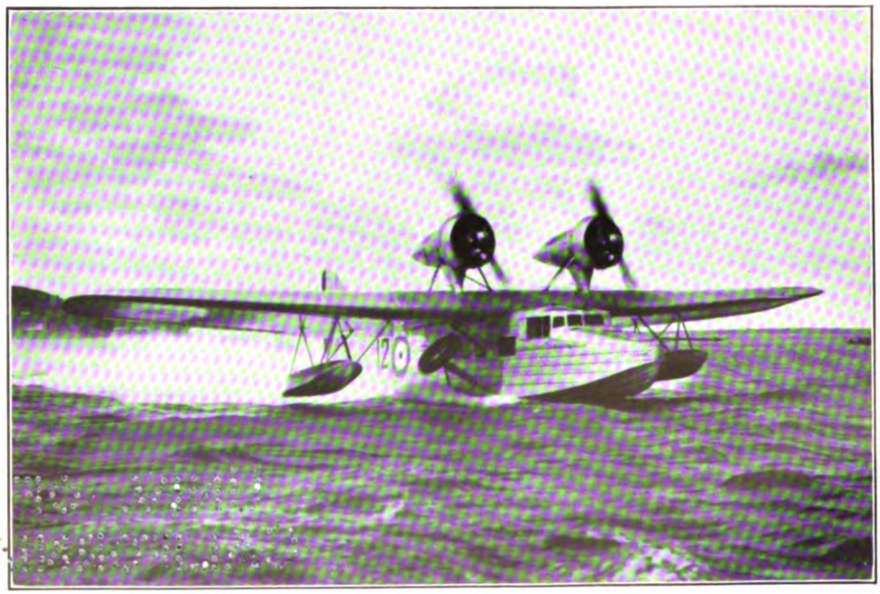
When loaded to its maximum permissible gross weight of 32,000 lb., the "Kent" has a maximum speed (at 5,000 feet) of 137 miles an hour. The cruising speed at 4,000 feet is 105 miles, and the minimum flying speed 60 miles. The initial rate of climb is 840 feet a minute, and the service ceiling (height at which the rate of climb has dropped to 100 feet a minute) 17,500 feet. The absolute ceiling is 19,500 feet. The machine takes off with full load in 26 seconds, and reaches an altitude of 5,000 feet in 7 minutes.

The engine arrangement, with the four engines abreast in the gap between the planes, has been found to work well in actual service. Not only are the engines very accessible for overhaul and replacements, but it has been found that for manœuvring on the water the farthest outboard engines are very valuable in enabling the machine to be turned in a very small space.



"SARO WINDHOVER" FLYING BOAT.

(Builders, Messrs. Saunders-Roe, Cowes.)



"SARO CLOUD" FLYING BOAT ("DOUBLE MONGOOSE" ENGINES).

(Builders, Messrs. Saunders-Roe, Cowes.)

Supermarine 6-Engined Flying Boat.

In last year's " Annual " reference was made to the new 6-engined flying boat which the Supermarine Aviation Works had designed for Imperial Airways. This new boat being of a very experimental nature, the work has taken somewhat longer than was expected, and it was not until the autumn of 1931 that actual construction work was begun. In the main, the machine will follow the scheme outlined in last year's " Annual," but certain changes may now be recorded. To begin with, the designers have found that by slightly increasing the wing area (to 4,150 square feet), and by going to a greater gross weight, better results would be obtained, and so the tare weight, the pay load and the gross weight now contemplated are all greater than those quoted previously. With petrol for a range of 1,200 miles the machine will carry a crew of 7 with 40 passengers seated, or 20 passengers if bunk accommodation is to be provided. Of other changes made in the construction it may be mentioned that it is now not intended to use stainless steel for the boat hull frames and underwater portions, and that duralumin will be used instead.

Barring unforeseen delays, the six-engined Supermarine boat should be launched during 1932, and by the time next year's "Annual" is published it should be possible to give a description of the actual machine.

Saunders-Roe Flying Boats.

During last year yet another was added to the family of " Saro " flying boats designed and constructed by Messrs. Saunders-Roe, of Cowes, Isle of Wight. The little " Cutty Sark " and the " Flying Cloud " were described in last year's " Annual." The new addition was referred to briefly, and bears the name " Windhover." One of these machines is illustrated in the plate opposite, from which it will be seen that in its general lines it resembles closely the other two types of " Saro " flying boats. Structurally also the " Windhover " follows normal " Saro " practice, in that it has a duralumin hull and a wooden wing planked with three-ply.

The " Windhover " is intermediate in size between the " Cutty Sark " and the " Cloud," and is powered by three De Havilland " Gipsy II." engines of 120 h.p. each. The machine is supplied either as a plain flying boat or as an amphibian. As a plain flying boat the tare weight is 3,600 lb., and the gross weight 5,600 lb. When fitted with a land undercarriage the " Windhover " has a tare weight of 4,000 lb., the gross weight remaining at 5,600 lb.

The land undercarriage is of a design different from that used on the " Cutty Sark." The oleo leg has a knuckle joint in the centre and is capable of being broken inwards towards the hull, the raising and lowering being done by cables and a winch. The advantage of this type of amphibian undercarriage is that the whole of the mechanism is placed outside the hull, so that the cabin space is left free.

When the " Windhover " is fitted with the land undercarriage

it has been found an advantage to increase the wing area. This is accomplished by adding a small top wing mounted above the engines. In both its forms the " Windhover " will fly with any one of the three engines stopped. As a flying boat it has a maximum speed of 110 miles an hour, while with the land undercarriage added the top speed drops to 102 miles.

During 1931 Messrs. Saunders-Roe produced a successful development of the " Cloud." This took the form of a machine suitable for training R.A.F. pilots in seaplane work, and was the standard " Cloud " fitted with two Armstrong-Siddeley " Double Mongoose " (geared) engines. Apart from the substitution of these engines, minor improvements were effected, which together brought the top speed up from 112 to 120 miles an hour, with a corresponding improvement in the climb. The machine has a remarkably quick take-off from both land and water. From water the take-off is accomplished in about 10 seconds under conditions of light winds. When fitted to carry 8 passengers the gross weight is 9,200 lb.

Proposed New Types.

Towards the end of 1931, the Directorate of Civil Aviation announced in its Annual Report on the progress of Civil Aviation that certain new types were under consideration. Of these only two are commercial marine aircraft.

One of the new types proposed by the Directorate of Civil Aviation is to be an amphibian flying boat, constructed entirely of metal, and intended for use on moderately sheltered waters such as the Nile. It is to have three or four engines, and the main requirements are to be reliability and ease of maintenance, comfort of passengers, suitability for operation in shallow or restricted waters, a range of 700 miles, a cruising speed of 110 miles an hour, and a pay load of not less than 3,000 lb.

The other type proposed is more ambitious, and it is doubtful whether it will materialise during the present year. It is a trans-oceanic flying boat with an all-up weight of 60 tons, capable of carrying out long-distance flights over the sea, and with a cruising speed not less than 120 miles an hour. Normally the machine will not be required to cover very long stages, and 600 miles' range is foreseen as the normal; but when required it must be capable of taking on a greater proportion of fuel and covering in non-stop flight stages of 2,500 miles. The internal accommodation of this machine must provide for flights of 12 hours' duration, with provision for sleeping 50 per cent. of the passengers.

The Editor of " Flight."

NAVAL REFERENCE SECTION.

STATEMENT TO ACCOMPANY NAVY ESTIMATES, 1931.

THE net total of the Navy Estimates for 1931 is £51,605,000, which is £342,200 *less* than the net total of the 1930 Estimates, including the Supplementary Estimate of last July.

It will be remembered that the original Estimates last year included no provision for the 1930 programme of shipbuilding, because the London Naval Conference was then still sitting, and that subsequently a Supplementary Estimate covering these services was presented to the House of Commons in July last, and approved. It is therefore convenient, as well as in accordance with Parliamentary custom, that the comparisons made throughout the new Estimates should be with the combined original and supplementary Estimates for 1930.

Taking this basis of comparison, whilst the *net* total is £342,200 less than in 1930, the *gross* total (£54,679,560) is £1,818,779 less than in 1930, because the Appropriations-in-Aid are £1,476,579 less. And this is after allowing £600,000 less for overhead or shadow cut than last year. Therefore reductions of no less than £2,418,779 gross have had to be found in order to provide the net reduction of £342,200. In this I have been assisted by estimated savings of about £500,000 through lower prices and the consequent changes that will become operative during the year in those scales of pay and allowances which vary according to the cost of living, and also by the elimination of certain items of repayment work on the expenditure side. But after allowing for these items, it has been necessary to achieve other economies of at least £1,250,000.

A large part of the falling-off in Appropriations-in-Aid is due to such causes as the completion in 1930 of the instalments of the generous contribution made by the Federated Malay States towards the cost of the Singapore Naval Base, and a heavy fall in the earning powers of the Admiralty Oversea Oilers owing to the depressed state of the freight market. The decrease also arises in part from the completion of the refit of the Chilean Battleship Almirante Latorre, smaller anticipated payments by Dominion Governments for equipment and stores supplied, and similar causes.

The smaller overhead deduction has been decided upon partly on account of the diminished amount of contract work which will be in hand during the year, and partly as a result of the experience of the last two years, which has shown conclusively that underspending owing to delays in the progress of work no longer occurs on such a large scale as formerly.

On the side of reduction, the action of the Government in

curtailing the 1928 and 1929 programmes continues to affect the provision required for New Construction, which is less by £241,000 than it was in 1930. (It should not be forgotten that it is also less by £4,000,000 than it would have been, if the programmes had been carried through as originally approved.)

Further, the provisions of the London Naval Treaty relating to the earlier scrapping of Capital Ships have been the main factor in effecting a saving on cost of personnel amounting in these Estimates to some £400,000. The Vote A figure for 1931—93.650—represents the number expected to be borne on the first day of the new financial year, and that number is expected to fall (almost entirely by natural wastage) to 91,840 by 31 March, 1932.

In this connection I would call attention to the following striking contrast. The numbers voted by Parliament in 1928 to be borne on April 1, 1928, were 101,800. The numbers to be borne on the March 31, 1932, are 91,840. In the space of exactly four years the strength of the personnel of the Navy will actually have been reduced by 10,000 officers and men.

A substantial saving is also effected on the Fleet Air Arm Grant (Vote 4), owing to the fact that the Board have decided, solely on account of the financial exigencies of the present time, to accept a retardation of the programme of development of the Fleet Air Arm, by adding only one new Flight in 1931 instead of two as last year.

Over and above these major savings, however, a very large sum in the aggregate remained to be found, and has been found, by the rigid scrutiny of all items of expenditure proposed for inclusion in the various Votes, and by the omission or further retardation of many, some of them most important, services.

The new programme of shipbuilding for 1931 is set forth in detail on a later page. This programme is the normal annual instalment of building under the London Naval Treaty. If, however, the progress realised at the Disarmament Conference indicates that reductions are possible of achievement it will still be possible for His Majesty's Government to cancel or postpone the various items in the programme.

A. V. ALEXANDER.

ADMIRALTY,
March 2, 1931.

NOTES ON MATTERS OF GENERAL INTEREST.

Distribution of the Fleet.

Battleships and Battle Cruisers.

As a result of the London Naval Treaty, five Capital Ships are being removed from the effective list. The Benbow has already been placed upon the disposal list. The Emperor of India has been paid off, and the Marlborough will be withdrawn from service in April: these two ships will be utilised for certain trials and then scrapped. The Iron Duke is to be de-militarised during the year, and will then continue her duties as Gunnery Training Ship at Portland. The Battle Cruiser Tiger will be withdrawn from the Fleet in April and subsequently scrapped.

The disappearance of the Benbow, Emperor of India and Marlborough has involved the abolition of the seagoing training squadron for boys (The Third Battle Squadron). For the present boys after leaving the Shore Training Establishments will be trained in the ships of the seagoing squadrons.

Aircraft Carriers.

The Glorious joined the Mediterranean Fleet in the summer of 1930.

The Courageous was withdrawn from the Mediterranean Fleet in the course of the last year, and after dockyard repairs joined the Atlantic Fleet in the autumn of 1930.

The Furious, on completion of repairs about December, 1931, will be recommissioned for service with the Atlantic Fleet, when these three Aircraft Carriers will all be working with the Main Fleets for the first time.

Cruisers.

During the past year the York, Norfolk and Dorsetshire have joined the Second Cruiser Squadron in the Atlantic Fleet, replacing the Frobisher and two "C" Class cruisers. The Exeter is expected to join this squadron in July, 1931, replacing the Hawkins. The squadron will then consist of four new ships.

The Caradoc commissioned in July, 1930, for service with the China Squadron. For the past three years a "C" Class cruiser had been lent from the Mediterranean Fleet for duty at Hankow during winter months, but it was decided that requirements would be better met for the immediate future by reducing the Third Cruiser Squadron by one ship and adding a "C" Class cruiser to the China Squadron.

Destroyers.

The Codrington and seven "A" class destroyers have joined the Mediterranean Fleet. The Acheron, the remaining vessel of this class, has special experimental machinery, and will, when completed, be attached to the Atlantic Fleet for a period.

The Keith and the eight "B" class destroyers will proceed, on completion, to the Mediterranean to replace the Fourth Destroyer Flotilla. The latter flotilla, after refit at home ports, will proceed to China in the winter of 1931 to replace the flotilla of "S" Class vessels which are due for scrapping in 1932.

Submarines.

Four "O" Class submarines, with their new Depot ship the Medway, are now in service on the China Station.

Four "P" Class submarines are now on their way to China, and will be followed in the spring by two more "O" Class and the other two "P" Class submarines.

During the year the last of the four "R" Class submarines will be completed, and they will join the Mediterranean Fleet.

An offer made by the Commonwealth Government to transfer to the Royal Navy the submarines Oxley and Otway, which were completed in 1927, has been accepted, and these vessels also will join the Mediterranean Fleet. The Oberon will complete the Mediterranean Flotilla.

The "L" Class submarines now in the Mediterranean will be withdrawn upon relief, and will serve in home waters.

Sloops.

The new sloops Folkestone, Scarborough, Hastings, and Penzance have replaced four old sloops abroad.

River Gunboats.

The Falcon on completion for service on the Yangtse-Kiang about September, will replace the Widgeon and Teal, both of which are nearly 30 years old.

CO-OPERATION WITH THE DOMINIONS.

Imperial Conference, 1930.

Although Imperial Defence was not made the subject of plenary discussions at this Conference, opportunity was taken of the presence of Service representatives from overseas for the discussion of matters of common concern in regard to Naval Defence, advancing the work done at the 1926 Conference.

An important conclusion was reached in connection with the Naval Base at Singapore, in the following terms :—

> "As a result of discussion between representatives of the United Kingdom, the Commonwealth of Australia and New Zealand, it was recommended that the present policy of the ultimate establishment of a defended naval base at Singapore should be maintained and that the Jackson Contract should be continued. It was, however, also recommended that, apart from the latter expenditure and such as will be required for the completion of the air base on the scale at present contemplated, the remaining expenditure, i.e. that required for completing the equipment of the docks and for defence works, should be postponed for the next five years, when the matter could be again reviewed in the light of relevant conditions then prevailing."

Commonwealth of Australia.

The periodical interchange of ships between the Royal Navy and the Royal Australian Navy, which it was hoped would take place in October, 1930, was cancelled at the request of the Commonwealth Government for financial reasons.

New Zealand.

The Diomede completed her refit in England and has now returned to New Zealand. The Dunedin will be refitted in England during 1931.

During the recent earthquake in the district of Hawkes Bay, North Island, New Zealand, the ships of the New Zealand Division and H.M.S. Veronica rendered valuable aid.

The Veronica was at Napier at the time of the first shock and the Commodore Commanding the New Zealand Division in the Dunedin with the Diomede in company, proceeded there immediately from Auckland, with doctors, nurses, and medical and other stores on board.

Telegraphic communications had been destroyed by the convulsion, and the Wireless Telegraph apparatus of the ships was of great assistance.

FLEET ACTIVITIES ABROAD.

Atlantic.

In July, 1930, the Commander-in-Chief, Atlantic Fleet, flying his flag in the Nelson, proceeded to Brest to pay a visit to the French Naval Commander-in-Chief ashore, and was accorded a most friendly reception, our officers and men being entertained with most generous hospitality.

Quite recently the Nelson, flying the flag of the Commander-in-Chief, with the Rodney, the four ships of the Second Cruiser Squadron (the Hawkins, Dorsetshire, Norfolk and York), and the Minelayer Adventure have visited various British West Indian Islands and received an enthusiastic welcome. The Commander-in-Chief, in the Nelson, passed through the Panama Canal and paid a most enjoyable and memorable visit to the Commander-in-Chief, United States Fleet in the Canal zone.

Mediterranean.

A most successful visit to Constantza was paid in August, 1930, by the Curacoa, flying the flag of Rear-Admiral Davies, and accompanied by the destroyers Antelope and Ardent. A return visit of Roumanian destroyers will probably take place in May, 1931.

In November last the Bryony conveyed King Feisal of Iraq to Cyprus on a visit to his father, the ex-King Hussein, who was dangerously ill. The same vessel subsequently conveyed the ex-King Hussein with King Feisal to Alexandria *en route* for Baghdad.

The Commander-in-Chief, Mediterranean, flying his flag in the Queen Elizabeth, will visit Toulon in April to return the visit of Admiral Durand Viel, the Commander-in-Chief, French Mediterranean Fleet, to Malta last November; and in the same month he will visit the Commander-in-Chief of the Italian Fleet at Spezzia.

East Indies.

In November, the Effingham conveyed H.R.H. the Duke of Gloucester from Aden to Djibouti to attend the Coronation of the Emperor of Abyssinia at Addis-Ababa. Vice-Admiral Fullerton, the Commander-in-Chief, East Indies, was also present at this ceremony.

Red Sea and Persian Gulf.

Our sloops in these waters have continued their patrols as in past years for the prevention of slave traffic and the protection of British interests.

On February 22, 1930, an important meeting between King Feisal of Iraq and the King of the Hedjaz and Nejd took place on board the Lupin off Fao. At the close of this conference King Feisal thanked the British Government for the facilities afforded for bringing about the meeting.

Arrangements have been made for the Royal Air Force Flying Boats and the Sloops in the Persian Gulf to co-operate whenever possible.

America and West Indies.

Visits have been paid to United States and South American ports.

In the course of a South American cruise, the Delhi proceeded up the Amazon as far as Manaos, 930 miles from the entrance.

The Delhi was also able to be of service during disturbed conditions in Brazil, particularly in the evacuation of foreign women and children from Fernando Noronha, and on another occasion she was instrumental in suppressing a rising of Caribs in Dominica, when the situation had got beyond the control of the local police forces.

The Danae rendered valuable service at Santo Domingo after it had been devastated by a hurricane on September 4 last, a service which was gratefully recognised by the President of the Dominican Republic.

China.

Owing to the continuance of unsettled conditions in many parts, merchant shipping as well as property ashore have been much subject to the menace of attack by banditry, especially on the Yangtse-Kiang, and the services of the Yangtse flotilla of gunboats have been of great value in the protection of British life and property.

During the morning of December 4, 1930, the boats of the Suffolk rescued the crew of the German motor vessel Hedwig, ashore on the Pratas reef, 180 miles S.E. of Hong Kong. The position of the ship and the weather conditions prevailing at the time made this operation one of considerable difficulty.

The rendition of Wei-Hai-Wei took place on October 1, 1930. It has been arranged with the Chinese Government that the normal facilities for the China Squadron will continue to be available.

Chinese Navy.

Arrangements have been made with the Chinese Government for the loan of some officers of the Royal Navy to assist in the training of the Chinese Navy, and also for the training of some Chinese Naval Officers in England.

Twelve Chinese cadets and eight Chinese sub-lieutenants are now undergoing courses in Naval Establishments in England. The eight sub-lieutenants will complete their preliminary shore courses in March, and will then commence a period of training afloat in the Royal Navy.

In May next, four additional Chinese sub-lieutenants and six Chinese cadets will commence course in Naval establishments in England.

Hydrography.

Four Surveying Ships in home waters, two in the Mediterranean, Red Sea and Persian Gulf, and two in the Far East, have continued the important work of surveying coasts and waters that are still inadequately surveyed or that require re-surveying owing to natural changes which are continually taking place. The method of sounding by echo off the sea bed is now largely employed by Surveying ships, and a considerably larger output of work results from its use.

In addition a large amount of oceanographical work such as deep sea soundings, temperatures and salinities, is carried out by these vessels. During 1930 the Rosemary was engaged on this work, and also on useful exploratory surveys with the object of locating new fishing grounds north east of Rockall and off Iceland, under the

directions of the Admiralty and in conjunction with the Ministry of Agriculture and Fisheries.

The Challenger, on completion, will be used to extend this field of search, more especially within the Arctic Circle.

Navigation.

H.M. ships have co-operated in the improvement of navigation in many directions. Exhaustive trials are being carried out to improve the instruments for finding the speed of a ship at sea. Observations are being carried out in several of H.M. ships to ascertain the dip of the sea horizon in different parts of the world.

Fishery Protection.

The vessels of the Fishery Protection and Minesweeping flotilla have been engaged, as usual, on their useful work of general protection and assistance of the fishing fleets.

The Harebell assisted in evacuating the inhabitants of St. Kilda during August, 1930.

Co-operation between the Services.

Valuable experience continues to be obtained from the combined exercises with the Army and Royal Air Force which have formed part of the annual programme of squadrons whenever opportunity has offered.

Exchanges of officers between the three fighting services during tactical exercises have again been arranged, and the experience gained has proved of considerable value.

Naval Air Work.

Progress in Fleet Air Work has been hampered, to some extent, by the necessity for taking the Courageous and Furious in hand for periodical refits during the past year. The Hermes was also absent from the China Station for about three months, when she returned to the United Kingdom to recommission and re-equip her flights with new aircraft. The Fleets have therefore been unavoidably deprived of the full co-operation of aircraft carriers during certain exercise periods.

Good progress has, however, been made, particularly in the specialised training of the Fleet Air Arm personnel.

Two new types of fighting aircraft will be brought into service during 1931.

There are now 85 Naval Officers employed as observers. 127 Naval and Royal Marine Officers are serving as pilots in the Fleet Air Arm and 25 are under training.

Wireless Telegraphy.

The arrangements for broadcasting official messages to ships of the Merchant Navy in any part of the world have been revised in the light of experience, and increasingly good results are expected at the next test period in July, 1931.

Personnel.

A Committee is sitting under the Chairmanship of Sir Ernest Bennett, M.P., to consider the existing systems of entry of Naval Cadets, the object being to ensure that candidates of the standard necessary for the Naval Service should have a fair opportunity of being considered on their merits for entry as cadets from whatever types of schools and classes of the community they are drawn.

Another committee, under the chairmanship of Vice-Admiral F. Larken, C.B., C.M.G., has been set up to examine the present methods of promotion from the Lower Deck through the rank of mate, and to report what alterations are desirable.

Arrangements have been made for all junior Executive Officers (including Mates) and Probationary Lieutenants, R.M., to undergo a fortnight's course in elementary naval aeronautics in an aircraft carrier. Officers who are medically fit, and who volunteer to go up in the air, will be given as much air experience as possible.

The Board have decided upon an eventual reduction in the number of Rear-Admirals on the active list by eight officers, of which number six have already been reduced.

The results of the London Naval Conference have enabled the Board to take steps to place the establishment of Lieutenants and Lieutenant-Commanders on a satisfactory basis. Special terms of retirement have been offered to the officers of those years in which a surplus exists.

The R.N. School of Music has been transferred from Eastney, Portsmouth, to the R.M. Depot at Deal. This removal to a less congested area will benefit the boys under training and will free accommodation urgently required for other purposes at Eastney.

It has been decided to merge Officers' cooks and ship's cook ratings into one branch to be called Naval Cooks. It is hoped that this amalgamation will simplify entry, training and drafting of cook ratings.

It is hoped to complete by the end of this year the work of replacing the existing unsatisfactory and congested workshops and training facilities for Artificer Apprentices in hulks by adequate and up-to-date accommodation ashore at Chatham.

Matériel. New Construction.

The New Programme for 1931 includes provision for commencing the following new ships :—

Two Cruisers of "Leander" Class.
One Cruiser of about 5,000 tons.
One Leader and eight Destroyers.
Four Sloops.
Three Submarines.
One Shallow draught Gunboat.
One Mining Tender for "Vernon."
One Gate Vessel for Defence Booms.

Of these, two Cruisers, one Leader, two Sloops, one Submarine and the Tender for Vernon will be built in the Royal Dockyards; the remainder will be built by contract.

Cruisers.

"*Dorsetshire*" *Class* (1926 *Programme*).

The Norfolk and Dorsetshire were completed during 1930 and have joined the Fleet.

"*B*" *Class* (1926 *and* 1927 *Programmes*).

The York was completed during 1930 and the Exeter is expected to complete in July.

1929 *Programme.*

The Leander, the first of the 6-inch gun cruisers, is expected to complete towards the end of the financial year 1932.

1930 *Programme.*

Design drawings and specifications have been prepared for the three 6-inch gun cruisers of the 1930 programme, Neptune, Orion, and Achilles, and orders for these ships have been placed recently. The Neptune and Orion will be constructed at H.M. Dockyards, Portsmouth and Devonport respectively, the machinery being built by contract by the Parsons Marine Steam Turbine Company, Wallsend-on-Tyne, and Vickers-Armstrongs, Ltd., Barrow-in-Furness. The Achilles will be built and engined by Cammell, Laird & Company, Ltd., Birkenhead.

Leaders and Destroyers.

1927 *Programme.*

The Leader Codrington and all the Destroyers of the Acasta class—the first flotilla of post-war design—except the Acheron, joined the Fleet last year. Progress on the Acheron has been slower on account of the experimental nature of her special machinery, but she is expected to be delivered early in the financial year 1931.

1928 *Programme.*

The Leader Keith and the eight Destroyers of the "Beagle" Class are expected to be delivered before the end of March.

1929 *Programme.*

The Leader Kempenfelt building by J. S. White & Company, Ltd., should be completed early in the financial year 1932. The four Destroyers of the same programme ("Crusader" Class), viz., Crusader and Comet, building at H.M. Dockyard, Portsmouth, and Cygnet and Crescent, building by Vickers-Armstrongs, Ltd., are proceeding satisfactorily, and these vessels should be completed early in the financial year 1932. The Crusader and Comet are the first destroyers to be built in a Royal Dockyard.

The Destroyers Saguenay and Skeena ordered by the Canadian Government from Thornycroft & Company, Ltd., are completing and the Saguenay should be delivered

before the end of the present financial year, and the Skeena early in the financial year 1931.

1930 *Programme.*

Orders for the Leader Duncan and eight Destroyers of the "Defender" Class have been placed. Two Destroyers each will be built by the Fairfield Shipbuilding Company, Vickers-Armstrongs, Ltd., Palmers Shipbuilding & Iron Company, Ltd., and Thornycroft & Company, Ltd. The Leader will be built at Portsmouth Dockyard, the machinery being supplied by W. Beardmore & Company, Ltd., Dalmuir.

SUBMARINES.

The Orpheus, the last of the six ships of the "Odin" Class (1926 Programme), was completed early in the financial year 1930.

All six vessels of the "Parthian" class (1927 Programme) have been completed.

Of the four vessels of the "Rainbow" Class (1928 Programme) the Regent, Regulus and Rover have been completed. The Rainbow is due to be completed by the end of November, 1931.

The three Submarines of the 1929 Programme, Thames, Swordfish and Sturgeon, which were deferred pending the result of the London Naval Conference, are now under construction, the Thames at Vickers-Armstrongs, Ltd., and the Swordfish and Sturgeon at Chatham Dockyard.

Of the 1930 Programme, the Starfish and Seahorse will be built at H.M. Dockyard, Chatham. The third submarine of this Programme (the Porpoise) will be built by contract.

SLOOPS.

The Hastings, Penzance, Folkestone and Scarborough (1928 Programme) have, been completed and have joined the Fleet.

The Shoreham, Rochester, Fowey and Bideford (1929 Programme) are under construction, the first two at Chatham Dockyard and the others at Devenport Dockyard. They are expected to be ready for trials in the summer of 1931.

The 1930 Programme, consisting of four repeat sloops of the "Shoreham" Class, the Dundee, Weston-super-Mare, Falmouth and Milford, will be commenced at the end of the present financial year. The Dundee will be built at Chatham and the others at Devonport Dockyard.

The Sloop Hindustan, built by Swan, Hunter & Wigham Richardson, Ltd., on the Tyne for the Indian Government, arrived in India in January, 1931.

NETLAYER (1930 PROGRAMME).

The Guardian, netlayer and target towing vessel, is to be built at Chatham Dockyard, and will be ordered this month. The machinery will be supplied by the Wallsend Slipway and Engineering Co., Ltd.

RIVER GUNBOAT (1928 PROGRAMME).

The assembly of this ship (the Falcon) was completed at Yarrow and Company's works at Scotstoun in October, 1930. She was then dismantled and shipped in sections to Shanghai, where she will be completed about September, 1931.

FISHERY RESEARCH SHIP.

The Challenger, which is being constructed at Chatham Dockyard for fishery research work, was laid down on September 1, 1930, and is expected to complete in the autumn of 1931. The vessel is of 1,400 tons displacement with a speed of 12½ knots.

DOCKYARD ADMINISTRATION.

As an extension of the policy adopted last year of granting a week's leave with pay to all employees in H.M. Dockyards, etc., at home, who have completed a full year's service, the number of paid public holidays allowed to locally entered workmen at Malta, Gibraltar, Simonstown and Bermuda Dockyards has been increased by three.

The process of putting into force the changes recommended by Mr. R. S. Hilton's Committee on the financial system of the Dockyards continues. The changes were completed at Portsmouth Dockyard in April, 1930, and are in process of being effected at Devonport Dockyard, and, except clock-mustering, at Malta. The completion of this reorganisation at Portsmouth has enabled a novel method of payment of wages to be adopted under which each workman is handed his earnings when he clocks-off on pay day. This change has proved to be for the comfort and convenience of the workpeople.

MISCELLANEOUS.

Trials with a number of experimental types of catapult have been continued and it is now possible to proceed with production as required. Catapults have been fitted in the Valiant, Cornwall, York, and Submarine M.2, and it is proposed to fit them in eleven other vessels during the financial year 1931. Eight further catapults will be ordered in 1931.

The progress in modernising the high angle armament of the Fleet and installing the new fire control system for anti-craft guns has been continued during the past year.

Touch has been kept with modern engineering researches and developments, and Admiralty Officers have actively participated in the work of the various Standardising Committees preparing specifications for engineering material.

Further improvements have been effected in the arrangements for burning oil fuel and have been incorporated in certain vessels, and the results of the trials so far carried out have shewn a satisfactory gain in economy of fuel consumption.

Trials with satisfactory results have been carried out with oil produced from coal by low temperature carbonisation, and in compression ignition engines with heavy fuel oils obtained from the hydrogenation of coal. These trials will be continued in 1931.

The development of heavy oil engines for Naval purposes is proceeding steadily at the Admiralty Engineering Laboratory.

The construction of an advanced experimental type of high speed compression ignition engine, in which an attempt is being made to realise a considerable reduction in machinery weight, is now nearing completion, and it is hoped to commence trials in 1931.

Advantage is being taken of the general progress in the development of light high speed compression ignition engines. Experimental engines have been obtained and tested, both for use in Service power boats and as electric generating engines. Ignition compression generating sets are being provided as part of the equipment of the "C" and "D" Class Destroyers and the Sloops of the 1929 Programme. The adoption of these engines will lead to economy in fuel and greater reliability.

Light alloys are being incorporated in new designs wherever possible.

Certain special steels are being tried for turbine blading and for fittings under conditions of high temperature.

Considerable progress has been made with the investigations into the problem of saving life from disabled sunken submarines. The most important development in this respect is the production and supply of the Davis submerged escape apparatus to which I referred last year, and with which a large proportion of the submarine personnel have now been trained. Four experimental lifting pontoons have been built during the year, and these will be tried shortly by actually submerging and lifting an old submarine.

The experiments in deep diving have also made further progress.

ABSTRACT OF NAVY ESTIMATES FOR 1931.

Votes.		Estimates 1931.		Estimates 1930 (*a*).
		Gross Estimate.	Net Estimate.	Net Estimate.
	I.—NUMBERS.		Maximum Numbers.	Maximum Numbers.
A.	Number of Officers, Seamen, Boys, and Royal Marines	93,650	93,650	97,050
	Number of Royal Marine Police	550	550	500
	II.—EFFECTIVE SERVICES.	£	£	£
1	Wages, etc., of Officers and Men of the Royal Navy, and Royal Marines, and Civilians employed on Fleet Services	13,750,136	13,686,000	13,990,000
2	Victualling and Clothing for the Navy	4,077,738	3,401,200	3,679,000
3	Medical Establishments and Services	466,553	400,500	403,200
4	Fleet Air Arm	1,126,000	1,126,000	1,267,000
5	Educational Services	299,677	232,000	231,200
6	Scientific Services	555,717	482,500	480,800
7	Royal Naval Reserves	390,046	389,700	392,000
8	Shipbuilding, Repairs, Maintenance, etc.:			
	Section I.—*Personnel*	6,551,678	6,427,000	6,280,500
	Section II.—*Matériel*	5,836,300	4,683,870	4,168,200
	Section III.—Contract Work	4,522,670	4,456,200	5,013,800
9	Naval Armaments	3,801,560	3,433,500	3,382,800
10	Works, Buildings, and Repairs at Home and Abroad	2,573,850	2,288,500	2,073,950
11	Miscellaneous Effective Services	730,230	661,230	706,850
12	Admiralty Office	1,154,673	1,141,200	1,208,500
	Total Effective Services £	45,836,828	42,809,400	43,277,800
	III.—NON-EFFECTIVE SERVICES.			
13	Naval and Marine, Officers	3,146,167	3,127,500	3,120,000
14	Naval and Marine, Men	4,675,450	4,650,400	4,567,200
15	Civil Superannuation, Compensation Allowances, and Gratuities	1,021,115	1,017,700	982,200
	Total Non-Effective Services £	8,842,732	8,795,600	8,669,400
	GRAND TOTAL £	54,679,560	51,605,000	51,947,200

NET DECREASE . . . . . £342,200.

(*a*) Including Supplementary Estimate, 4 July, 1930 (Parliamentary Paper No. 152).

ADMIRALTY,
19 *Feb.*, 1931.

A. V. ALEXANDER,
F. L. FIELD,
C. FULLER,

ROGER BACKHOUSE,
L. G. PRESTON,
FRED C. DREYER,

CHARLES G. AMMON,
G. H. HALL,
O. MURRAY.

STATEMENT SHOWING THE NUMBERS BORNE, THE EXPENDITURE ON NAVAL SERVICES FOR THE YEARS 1917 TO 1929, AND THE ESTIMATES FOR 1930 AND 1931.

Year	Vote A. — Average numbers borne. (a)	Vote 1. — Wages, &c., of Officers, &c	Vote 2. — Victualling and Clothing.	Vote 3. — Medical Establishments, &c.	Vote 4. — Civilians employed on Fleet Services.	Vote 5. — Educational Services.	Vote 6. — Scientific Services.	Vote 7. — Royal Naval Reserves	Vote 8. — Shipbuilding, Repairs, Maintenance, &c. Section I. Personnel.	Vote 8. Section II. Matériel.	Vote 8. Section III. Contract Work.	Vote 9. — Naval Armaments.	Vote 10. — Works.	Vote 11. — Miscellaneous.	Vote 12. — Admiralty Office.	Vote 13. — Half Pay, &c.	Vote 14. — Naval, &c., Pensions.	Vote 15 — Civil Superannuation, &c.	Balances Irrecoverable	Total Expenditure.
		£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
1917	406,977	37,559,536	13,481,159	792,569	561,308	210,243	152,160	874,930	12,660,160	36,494,694	70,609,055	34,177,359	6,556,799	9,193,802	1,454,835	709,227	1,446,247	413,746	41,092	227,388,891
1918	381,311	46,373,511	24,219,351	1,158,287	491,270	247,922	262,886	871,970	15,037,763	59,128,675	94,248,874	64,866,784	10,928,241	9,357,532	1,985,894	704,914	3,733,778	445,485	28,090	334,091,227
1919	176,087	32,385,306	8,823,106	733,046	556,778	401,864	364,832	458,044	12,426,177	*Credit*:— 785,986	48,348,933	14,441,835	5,595,608	11,118,631	2,042,715	1,176,937	15,133,064	802,279	60,875	154,084,044
1920	124,009	21,314,360	8,311,708	683,830	759,110	503,152	249,185	359,694	12,096,747	6,799,965	12,001,445	8,493,951	4,992,969	5,724,974	2,073,764	2,352,344	4,847,475	880,996	23,611	92,505,290
1921	127,180	19,220,859	6,831,481	643,735	480,243	405,592	359,575	423,056	10,690,188	8,835,771	4,834,336	6,253,468	4,746,485	3,506,514	1,780,641	2,002,201	3,881,368	1,020,693	60,935	75,986,141
																Non-effective Services. Officers.	Non-effective Services. Men.			
1922	107,782	15,762,232	4,767,118	492,419	258,600	382,065	354,961	423,722	7,075,533	3,877,716	3,225,598	3,678,783	3,553,831	2,096,219	1,371,961	3,701,984	5,471,088	968,880	29,679	57,492,389
1923	99,107	14,175,111	4,153,803	410,842	193,793	330,644	379,489	459,391	6,751,496	5,521,336	4,427,874	3,840,606	3,215,766	982,173	1,247,813	2,856,764	4,260,245	823,340	33,864	54,064,350
1924	99,453	14,150,863	4,152,902	442,756	190,669	334,648	393,054	446,902	7,489,659	5,592,183	5,415,210	3,507,190	3,140,887	1,065,869	1,349,519	2,808,798	4,328,526	811,797	12,355	55,693,787
1925	100,284	14,576,499	4,226,570	440,209	Fleet Air Arm (b) 1,320,000	327,226	417,552	465,114	7,929,259	6,905,184	6,395,406	4,247,113	2,422,050	826,119	1,307,790	2,812,336	4,449,585	928,326	8,110	60,004,548
1926	100,791	14,322,678	4,236,846	434,919	681,000	324,036	393,330	444,759	7,487,952	5,422,141	7,275,173	3,595,037	2,108,441	930,369	1,203,639	2,914,419	4,450,140	894,472	23,002	57,142,862
1927	101,916	14,568,462	4,182,491	423,777	882,000	224,334	402,976	419,086	7,067,419	4,678,052	8,839,423	3,096,749	1,900,788	844,852	1,233,132	2,966,485	4,525,353	965,602	2,276	58,123,257
1928	100,680	14,435,347	3,992,639	418,863	1,008,300	226,486	396,298	403,295	6,743,571	5,074,290	8,263,060	3,871,235	1,950,207	728,841	1,181,125	3,006,321	4,496,310	944,735	4,223	57,139,146
1929	99,300	14,286,313	3,840,098	419,371	1,066,000	226,449	467,343	387,241	6,561,827	4,977,230	7,291,217	3,868,359	2,079,775	725,511	1,194,842	3,075,856	4,550,155	968,944	1,239	55,987,770
1930 (estimate)*	97,050(c)	13,990,000	3,679,000	403,200	1,267,000	231,200	480,800	392,000	6,280,560	4,168,200	5,013,800	3,382,800	2,073,950	706,850	1,208,500	3,120,000	4,567,200	962,200	—	51,947,200
1931 (estimate)	93,650(c)	13,686,000	3,401,200	400,500	1,126,000	232,000	482,500	389,700	6,427,000	4,683,870	4,456,200	3,433,500	2,288,500	661,230	1,141,200	3,127,500	4,650,400	1,017,700	—	51,605,000

Note.—The figures for Expenditure represent the Net Expenditure after taking into account receipts noted in the Navy Appropriation Account as receipts in excess of estimated Appropriations in Aid.

(a) Exclusive of Royal Marine Police. (b) Replacing "Civilians employed on Fleet Services," transferred to Vote 1 in 1925. (c) Maximum for the year.

* Including Supplementary Estimate, 4 July, 1930 (Parliamentary Paper No. 152).

COAL OR OIL AS FUEL FOR THE NAVY.

The following official statement was handed to a Deputation from the Committee of the Back-to-Coal Movement which was received at the Admiralty on July 1 last year :—

The question whether H.M. Ships should be designed to burn coal or oil has been under continuous consideration by the Board of Admiralty since oil-fired boilers first became a practicable proposition. Oil-burning was not adopted in the first place without thorough trial, and its use has not been extended without fully weighing all the advantages and disadvantages. Experience in the War showed most definitely the advantages of oil fuel.

The question may be considered under the following heads :—

(1) Operational.
(2) Technical.
(3) Manning.
(4) Supply.

Operational.—Ships burning oil fuel can steam continuously at maximum power until practically all fuel on board is expended, and without any increased effort on the part of the personnel. Speed can be increased or decreased at short notice without difficulty and in much less time than must be taken with coal-fired boilers. Coal-burning ships cannot steam full speed for more than a limited time without having to clean fires, while the work of maintaining an adequate supply of coal to the boilers becomes increasingly arduous and difficult.

Whereas oil can be pumped from any part of the ship without difficulty, coal has to be man-handled from the bunkers, and only those bunkers which are adjacent to the stokeholds are readily accessible. As coal is expended much greater labour is involved in preparing and arranging for its supply in sufficient quantity to the stokeholds. Owing to the necessity for maintaining the watertight sub-division of the ship the problem of supplying an adequate quantity of coal to the boilers during action has become a matter of grave difficulty, depending upon the quantity used previously and the duration of action conditions.

The endurance of a warship is of the highest operational importance, and experience shows that on any given weight of fuel the endurance of an oil-burning ship is nearly double that of a coal-burner.

Oil-burning warships can be refuelled much more rapidly and easily than coal-burners. The rate of fuelling with oil is $2\frac{1}{2}$ to 3 times that of coal, and with practically no effort on the part of the personnel, whilst ships can embark ammunition and stores at the same time.

At sea oil-burning ships can be steamed with a minimum of smoke, while at the same time the making of smoke is under control for tactical purposes. Absence of smoke is of high tactical and gunnery importance, and in this respect coal-burning ships are at a definite disadvantage.

Technical.—Oil has a calorific value 1·3 to 1·4 times that of coal.

The space required for the stowage of 1 ton of Welsh steam coal varies from 40 to 43 cu. ft., whereas 1 ton of oil averages about 38 cu. ft. Moreover, oil bunkers can be filled almost completely, whereas in coal bunkers there is an appreciable loss from broken stowage.

Oil can be stowed in any compartment, large or small, in any position in the ship, and the fullest use can be made of every available space throughout her hold without impairing supply to the boilers.

In coal-burning ships, as already stated, the only readily accessible stowage is abreast the boiler-rooms, and in ships requiring large endurance a large proportion of the coal must be stowed in bunkers which are not easily accessible or which cannot be worked without increasing the labour necessary to keep up and maintain supply. In the War, for example, many ships carried large quantities of coal in reserve bunkers which it was found impossible to use, and for operational purposes this coal might just as well not have been on board. Although this coal may have added somewhat to protection, the space and weight thus used up could have been made much better use of in other ways.

In a coal-burning ship a number of watertight doors must be fitted in the principal bulkheads to enable the coal to be brought to the stokeholds. Scuttles are also necessary in the protective and other docks for trimming and shipping purposes. Many of the doors, especially those opening on to the stokeholds and thus below water, have to remain open when the ship is steaming.

With oil fuel these doors and scuttles are not required, and the watertight sub-division is therefore more efficient, the protection is thereby improved, and the strength of the structure increased. Moreover, the bulkheads, decks, etc., forming the boundaries of the fuel tanks remain fully efficient, being always under test, a condition which cannot be assured with the boundaries of coal bunkers. In the latest warships, in which the weight of fuel carried is about 30 per cent. of the displacement, this advantage is most valuable.

With the limitations of weight and space incumbent upon all naval designs the rate of forcing of the boilers is necessarily high. With coal-fired boilers the consumption of coal per square foot of grate area must be large, in order to keep the boiler dimensions and weights within reasonable limits. At these high rates the consumption of coal is necessarily inefficient. Artificially forced draught must be resorted to, and relatively large quantities of unburned, or only partially consumed, fuel are carried away with the funnel gases. The boiler heating surfaces become foul and the gas spaces between the tubes choked with soot, ash, etc., with the result that heat transmission is impaired, efficiency is still further reduced, and the already dirty fires are required to burn even more coal than before, if the output of steam is to be maintained.

With oil fuel, on the other hand, the combustion of the fuel is under perfect control, and, with the latest improvements in oil-burning arrangements, practically complete combustion of the fuel in the furnace can be assured. In consequence, the efficiency of heat transmission is not impaired to any appreciable extent, even after prolonged steaming at high powers.

With coal fires the human element limits the size of fire grate to about 7 ft. 6 in. in length. The length of oil-fired boilers is not so limited, and oil-fired boilers 21 ft. in length are now being employed. For high-powered ships, therefore, the use of coal necessitates a large number of small boilers, whereas with oil the same output can be obtained from a small number of large units, resulting in a considerable saving in weight and space and more favourable watertight subdivision of the hull.

Owing to the ease with which it can be transferred from one compartment of the ship to another, oil fuel can be used readily for purposes of correcting the heel and trim of the ship in case of damage, or it can be pumped overboard if it is necessary to reduce draught. This facility may be of great importance. Coal and coal bunkers cannot be similarly made use of.

It can be stated definitely that on a given displacement, whilst retaining other military qualities, it would be impossible to design a coal-burning ship of the same speed and endurance as an oil-burner. If speed alone be considered, the displacement would be not less than 20 per cent. to 25 per cent. greater in the case of the coal-burner, but even in this larger ship the endurance would still be much less.

In effect, this means that if our ships were to burn coal while those of foreign Powers continued to use oil, our displacement would have to be consistently higher, which, on a limited tonnage figure (based on Naval Agreements with Foreign Powers) in each category, would be an overwhelming disadvantage.

With regard to the possible conversion of existing ships from oil to coal, it may be said that this is impracticable without the most extensive and expensive alterations, which would also have the effect of prejudicing design and greatly reducing speed and endurance, and that it would be impossible to make the change in existing vessels of the destroyer or cruiser type.

The "Royal Sovereign" class which has been mentioned in this connection was originally designed for coal, but this was changed at an early period in their construction, and it would not now be possible to revert to coal-burning without alterations which would be nearly as great as those in a ship wholly designed for oil fuel.

Manning.—The engineering complement of a ship is decided by the number of men required to steam the ship continuously at high-power, working in three watches. The engine-room complement of a coal-fired ship averages twice that of an oil-fired vessel of equal power. In a ship of the battle cruiser class this would mean an increase of complement of about 300 men ; in an 8-in. cruiser about 120.

Accommodation, provisions, drinking water, etc., would have to

be provided for this increased complement, absorbing weight and space which could otherwise be devoted to other items of military importance.

Could the Navy as it exists to-day be converted to coal-burning, it would require an addition of 15,000 engine-room ratings.

Supply.—Although the dependence of the Navy on foreign supplies of fuel is recognised to be a serious disability and the Admiralty would much prefer to be able to use fuel of home production, the military advantages of using oil are considered greatly to outweigh the disadvantages. We are not dependent upon the supplies from any one country or from any one part of the world, whilst reserves of oil fuel can be and are being built up in various places.

With the exception of the United States and Russia, other naval powers are also dependent for their naval fuel upon the supply of foreign-produced oil.

Conclusion.—Were the Navy to revert to coal as fuel, we should be accepting a handicap in design which would be a most serious set-back and could not now be undertaken without grave prejudice to the strength of the Fleet and its operational efficiency.

EXPENDITURE FOR NAVAL PURPOSES OF THE PRINCIPAL FOREIGN POWERS.

UNITED STATES NAVY.

APPROPRIATION BILL, 1931 (July 1, 1931, to June 30, 1932).

Appropriation Title.	Appropriations. 1931–32. Dollars.	Appropriations. 1930–31. Dollars.
Salaries, office of the Secretary of the Navy	215,520	201,760
Salaries, General Board	12,880	12,960
Salaries, Naval Examining Board	10,600	10,160
Salaries, Compensation Board	8,700	8,640
Contingent expenses, Navy Department	85,000	104,100
Printing and binding	575,000	625,000
Pay, Miscellaneous	1,555,500	1,525,000
Contingent, Navy	30,000	30,000
Temporary government, West Indian Islands	—	421,000
State Marine Schools	100,000	100,000
Care of lepers, Guam	38,000	35,000
Operation and conservation of Naval Fuel Reserves	160,000	175,000
Naval Research Laboratory	229,765	230,000
Salaries, office Naval Records and Library	39,960	39,000
Salaries, office of Judge Advocate General	130,240	134,880
Salaries, office of Chief of Naval Operations	73,760	72,780
Salaries, Board of Inspection and Survey	21,280	21,020
Salaries, Naval Communications	136,120	133,060
Salaries, Office of Naval Intelligence	41,620	41,060
Recreation for enlisted men	400,000	732,000
Contingent, navigation	10,000	10,000
Gunnery and engineering exercises	50,000	46,950
Instruments and supplies	776,091	592,000
Ocean and lake surveys	86,600	85,800
Naval training station, California	190,000	180,000
Naval training station, Rhode Island	271,000	240,000
Naval training station, Great Lakes	275,000	279,000
Naval training station, Hampton Roads	235,000	235,000
Naval Reserve	4,620,835	4,720,000
Naval Reserve Officers' Training Corps	130,000	130,000
Naval War College	116,958	115,000
Salaries, Bureau of Navigation	500,540	496,320
Salaries, Hydrographic Office	431,980	425,180
Contingent and miscellaneous expenses, Hydrographic Office	144,500	150,040
Salaries, Naval Observatory	196,300	195,380
Contingent and miscellaneous expenses, Naval Observatory	42,500	33,700
Astrographic and astronomical plant	50,000	—
Engineering	19,243,040	20,101,400
Engineering Experimental Station, Annapolis		175,000
Salaries, Bureau of Engineering	333,040	316,220
Construction and repair of vessels	18,451,400	17,941,300
Salaries, Bureau of Construction and Repair	393,900	388,780
Ordnance and ordnance stores	11,930,585	11,669,400
Torpedoes and appliances		450,000
Purchase and manufacture of smokeless powder	1,000,000	1,000,000

UNITED STATES NAVY—*continued.*

Appropriation Title.	Appropriations. 1931–32. Dollars.	1930–31. Dollars.
Salaries, Bureau of Ordnance	166,020	160,360
Pay, Subsistence and transportation	154,040,870	156,484,500
Maintenance, supplies and accounts	10,100,000	10,205,000
Fuel and transportation	8,513,171	9,600,000
Salaries, Bureau of Supplies and Accounts	876,220	861,000
Medical Department	2,080,000	2,080,000
Care of the dead	75,000	75,000
Salaries, Bureau of Medicine and Surgery	87,560	86,280
Maintenance, Yards and Docks	9,014,816	8,000,000
Contingent, Yards and Docks	150,000	125,000
Salaries, Bureau of Yards and Docks	317,300	312,920
Public works	12,164,000	10,814,600
Aviation, Navy	31,145,000	32,033,211
Salaries, Bureau of Aeronautics	290,400	287,240
Pay, Naval Academy	919,154	915,000
Current and miscellaneous expenses, Naval Academy	90,000	90,000
Maintenance and repairs, Naval Academy	1,000,000	1,000,000
Pay, Marine Corps	16,471,185	16,321,125
Pay, civil employees, Marine Corps	305,567	302,507
General expenses, Marine Corps	8,598,435	8,897,173
Increase of the Navy—C. and M.	31,100,000	49,965,000
Increase of the Navy, A. A. and A.	7,200,000	
Modernisation of vessels*	—	7,400,000*
Contract authorisation for aeroplanes	7,700,000	—
Total Annual appropriations	358,253,952	380,644,786
Total Permanent and indefinite	1,838,510	1,851,550
Total	360,092,462	382,496,336

* A supplementary $10,000,000 was voted in addition to this for both years 1930–31 and 1931–32.

IMPERIAL JAPANESE NAVY.

Estimates, 1931–32 (April 1, 1931, to May 31, 1932).

The Estimates of the Imperial Japanese Navy are divided under two headings "Ordinary" and "Extraordinary."

The figures for 1931–32 as compared with the previous year are as follows:—

	1931–32. Yen.	1930–31. Yen.
Ordinary	—	151,161,906
Extraordinary	—	111,775,782
Total	210,341,290	262,937,688

The "Ordinary" expenditure is for pay, provisions, etc., and the general upkeep of the Fleet and its Air Service, and the "Extraordinary" expenditure for new construction and additions and improvements to the present Fleet and its Air Service and establishments.

FRENCH NAVY.

Estimates, 1931–32.

The figures for 1931-32, including the votes for new construction, as compared with the previous year, are as follows:—

	1931-32. Francs.	1930-31. Francs.
Ordinary	1,341,691,566	1,233,298,434
Extraordinary	1,498,138,748	1,489,442,955
Total	2,839,830,314	2,722,741,389

ROYAL ITALIAN NAVY.

Estimates, 1931–32.

(July 1, 1931—June 30, 1932.)

Ordinary Expenditure.	1931-32. Lire.	1930-31. Lire.	1929-30. Lire.
General Expenses . . .	5,379,800	—	4,524,000
Pensions	104,070,000	—	83,070,000
Education	—	—	3,490,000
Lighthouses and Pilotage .	6,703,000	—	5,720,000
Maintenance, Construction, Armaments, Establishments, and Coast Works	1,049,955,000	—	864,012,000
Supplementary	—	—	23,020,000
Total	1,166,107,800	1,213,667,000	983,836,000
Extraordinary Expenditure.			
General expenses of the Navy and Various . .	371,525,000	371,014,000	227,633,630
Total	1,573,622,800	1,584,681,000	1,211,469,630

The par rate of exchange is 92·46 lire to the £.

GERMANY.

(April 1, 1931—March 31, 1932.)

	1930-31. Reich Marks.
Ordinary	35,980,800
Extraordinary . .	52,643,900
Total . .	188,624,700

	1931-32. Reich Marks.
Gross	189,355,550
Appropriations in aid .	5,851,200
Nett . .	183,504,350

BRITISH AND FOREIGN NAVIES.

PRINCIPAL OFFICIALS.

Great Britain.

First Lord.—The Right Hon. Sir Bolton M. Eyres-Monsell, M.P.

First Sea Lord and Chief of Naval Staff.—Admiral Sir Frederick L. Field, K.C.B., K.C.M.G.

Second Sea Lord and Chief of Naval Personnel.—Admiral Sir Cyril T. M. Fuller, K.C.B., C.M.G., D.S.O.

Third Sea Lord and Controller.—Vice-Admiral Roger R. C. Backhouse, C.B., C.M.G.

Fourth Sea Lord and Chief of Supplies and Transport.—Vice-Admiral Lionel G. Preston, C.B.

Deputy Chief of Naval Staff.—Vice-Admiral Frederic C. Dreyer, C.B., C.B.E.

Civil Lord.—Captain David Evan Wallace, M.P.

Parliamentary and Financial Secretary.—Lord Stanley.

Permanent Secretary.—Sir Oswyn A. R. Murray, G.C.B.

Foreign Powers.

Country.	Minister of Marine.	Chief of Staff.
Argentina	Vice-Admiral (retd.) Zurueta	Capt. R. Camino
Brazil	Rear-Admiral A. S. Pinto da Luz	Vice-Admiral José Maria Penido
Chile	Vice-Admiral Enrique Spoerer	Rear-Admiral Alejandro Garcia
China	Admiral Yang Shu-Chwang	
Denmark	Monsieur Rasmussen	Rear-Admiral H. Rechnitzer
France	G. Dumesnil	Vice-Admiral L. H. Violette
Germany	General W. Groener	Admiral Dr. Raeder
Greece	D. Botsaris	Rear-Admiral G. Panas
Italy	Am. di Divisione G. Sirianni, C.M.G.	Am. di Squadron E. Burzagli, C.B.
Japan	Admiral Osumi	Admiral N. Tanaguchi, K.C.M.G.
Netherlands	Dr. L. N. Deckers	Vice-Admiral J. C. Jager
Norway	Mons. T. Anderssen-Rysst	Rear-Admiral Von der Lippe
Peru	Sr. Nunez Chavez	Rear-Admiral W. S. Pye (Captain, U.S.N.)
Poland	Rear-Admiral Augusto Loayza	Captain J. Swirski
Portugal	Captain Magalhaes Correia	Rear-Admiral Mariano da Silva
Soviet Union	N. E. Voroshilov (President, Committee of Defence)	R. A. Muklevitch
Spain	Rear-Admiral D. Salvador Carvia y Caravaca	Vice-Admiral D. Jose Nunez Quijano
United States	Charles F. Adams	Admiral W. V. Pratt
Siam	V.-A. H.S.H. Prince Toom	R.-A. Phra Rajvangsang
Sweden	C. G. Ekman	Commodore N. E. F. Selander

Corrected to December, 1931.

BRITISH AND FOREIGN NAVAL ATTACHÉS.

British Naval Attachés Accredited to Foreign Countries.

To:—

Albania, Bulgaria, Greece, Italy, Yugoslavia, Roumania, and Turkey: Naval Attaché, Captain R. B. Ramsay, R.N. (appointed 28th April, 1931); Headquarters, Rome, Italy.

Belgium, France, Netherlands, Portugal and Spain: Naval Attaché, Captain J. U. P. Fitzgerald (appointed 8th October, 1931); Headquarters, Paris, France.

Denmark, Esthonia, Finland, Germany, Latvia, Lithuania, Norway, Poland and Sweden: Naval Attaché, Commander M. A. Hawes (appointed 4th April, 1929); Headquarters, Berlin, Germany.

Japan and China: Naval Attaché, Captain M. G. B. Legge, D.S.O. (appointed 27th December, 1929); Assistant Naval Attaché Engineer Commander C. B. Evington (appointed 4th June, 1930): Headquarters, Tokyo, Japan.

U.S.A., Cuba, Mexico, and Panama: Naval Attaché, Captain P. Macnamara (appointed 28th March, 1931); Assistant Naval Attaché, Engineer-Commander W. C. Horton (appointed 8th September, 1928): Headquarters, Washington, U.S.A.

South America, including the Argentine Republic, Brazil, Chile, Ecuador, Peru, and Uruguay: Naval Attaché, Captain E. de F. Renouf (appointed 15th August, 1930).

Foreign Naval Attachés Accredited to Great Britain.

From:—

Argentine Republic: Naval Attaché, Captain Don Dalmiro Saenz, 30, Grosvenor Gardens, S.W.1.

Brazil: Naval Attaché (none at present): Abford House, Wilton Road, London, S.W.1.

Chile: Naval Attaché (none at present).
3, Hamilton Place, Park Lane, London, W.1.

Denmark: Naval Attaché (Post vacant):

France: Naval Attaché, Capitaine de Vaisseau, Y. Douval; Assistant N.A., Lieutenant Commander André Bron: Address, Albert Gate House, Hyde Park, London, S.W.1.

Greece: Naval and Air Attaché, Captain Demetrius Phocas; Assistant N. & A. A., Commander Evanghelos Roussos: Address, Flat B, Upper Feilde, Park St., London, W.1.

Italy: Naval Attaché, Commander Angelo Iachino; Assistant N.A. (none at present): Address, 7, Onslow Gardens, S.W.7.

Japan: Naval Attaché, Captain Shiro Takasu, I.J.N.; Assistant Naval Attaché, Lieutenant Commander S. Kaneko, I.J.N.: Address, Broadway Court, Westminster, London, S.W.1.

Norway: Naval Attaché (Post vacant): Address, Offices of the Norwegian Legation, 21-24, Cockspur Street, London, S.W.1.

Peru: Naval Attaché, Captain Don Manuel D. Faura: Address, Peruvian Legation, 65, Cadogan Square, London, S.W.1.

Roumania: Commander Gheorghe Niculescu, 4, Cromwell Place, London, S.W.7.

Serbs, Croats and Slovenes (Kingdom of): Naval and Air Attaché, Captain Vladimir Mariasevic: Address, c/o Yugo-Slavian Legation, 195, Queen's Gate, London, S.W.7.

Spain: Naval Attaché, Capitan de Corbeta Don Juan Pastor y Tomasety: Address, 64, Victoria Street, London, S.W.1.

Sweden: Naval Attaché, Captain E. A. Öberg: Address, Swedish Legation, 27, Portland Place, London, W.1.

United States of America: Naval Attaché, Captain A. Le R. Bristol, U.S.N.; Assistant Naval Attachés, Commander R. T. Hanson (C.C.), Lieutenant Commander G. D. Murray, U.S.N., Lieutenant Commander Howard E. Kingman, U.S.N., Lieutenant E. H. Bryant, U.S.N.: Address, 6, Grosvenor Gardens, Westminster, London, S.W.1.

Uruguay: Naval Attaché (Post vacant).

DIMENSIONS AND PARTICULARS

OF

BRITISH AND FOREIGN WARSHIPS.

LIST OF BRITISH AND FOREIGN SHIPS.

Warships are arranged alphabetically, except in certain cases in which vessels of the same class have been kept together. The following abbreviations are used throughout the List:—

a.c.	Armoured cruiser.
a.g.b.	Armoured gunboat.
b.	Battleship.
b.c.	Battle-cruiser.
l.cr.	Light cruiser.
Flot. ldr.	Flotilla leader.
c.d.s.	Coast-defence ship.
P. L. Cr.	Protected light cruiser.
M.Cr.	Minelaying cruiser.
cr.	Cruiser.
A.A.	Anti-aircraft guns. (H.A. = High angle).
A.C.	Aircraft carrier.
A.T.	Aircraft tender.
S.C.	Seaplane carrier.
g.b.	Gunboat.
g.v.	Gun-vessel.
H.A.	High angle = A.A. Anti-aircraft.
H.N.S.	Harvey nickel steel.
H.S.	Harveyised or similar hard-faced steel.
K.S.	Krupp steel.
p.v.	Patrol vessel.
t.	Turret-ship (in class column).
t.	Speed and H.P. at trials (in speed and H.P. columns).
to.cr.	Torpedo-cruiser.
to.g.b.	Torpedo-gunboat.
L.	Light guns under 15 cwt., including boats' guns.
M.	Machine guns.
sub.	Submerged torpedo tube.

The following abbreviations are used to distinguish the various types of boilers:—

W.T.	Water-tube boilers, where the type is not known.
B.	Belleville.
Bl.	Blechynden.
B. & W.	Babcock and Wilcox.
D'A.	D'Allest.
My.	Myabara.
N. or Nic.	Niclausse.
Nor.	Normand.
N.S.	Normand-Sigaudy.
T.	Thornycroft.
T.S.	Thornycroft-Schulz.
Y^1.	Yarrow small tube.
Y^2.	Yarrow large tube.

The following abbreviations distinguish types of turbines:—

P.T.	Parsons.
(G.)	Geared turbines.
C.T.	Curtis.
B.C.T.	Brown-Curtis.

A reference is now given in the tables to the pages (marked P1, P2, etc., towards the end of the volume) on which names of the ships appear.

Unless otherwise stated, the displacements are Standard displacements (*i.e.* excluding fuel and reserve feed water).

In some cases for Capital Ships the displacements accepted at the Washington Conference of 1921–2 are also given.

GREAT BRITAIN.—Armoured Ships.

Class.	NAME. Date for Scrapping under Washington Treaty.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Normal Draught.	Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement (War)
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.	in.	in.	in.	in.			knots.	tons	
b.	**Barham** . . 1935 *See p.* P27.	30,000	643¾	90 6	31 3	75,000 B. & W.	Clydeb'nk	J. Brown B.C.T.	1914	1915	2,408,000	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *4-in.* A.A., 4 *3-pr.*; 5 M.; 10 L.	4 (sub.)	25	— / 3400	1126
b.c.	**Hood** . . 1941 *See p.* P28.	42,100	860¾	105 3	28 6	144,000	Clydeb'k	J. Brown . B.C.T. (G.)	1918	1920	5,843,039*	12–6	3–1	7–5	5–4	11	(*a*)	8 *15-in.*, 12 *5·5-in.*, 4 *4-in.* A.A., 4 *3-pr.*; 5 M.; 10 L.	4 (deck) 2 (sub.)	31	— / 4000	1341
b.	**Malaya¶** . . 1936 *See p.* P27.	31,100	640¼	104 0	31 3	75,000 B. & W.	Walker .	Wallsend . P.T.	1915	1916	¶	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *4-in.* A.A., 4 *3-pr.*; 5 M.; 10 L.	4 (sub.)	25	— / 3400	1136
b.	**Nelson** . . 1942 *See p.* P25.	33,500	710	106 0	30 0	45,000	N'wc'stle-on-Tyne	Wallsend .	1925	1927	6,410,071*	14	6¼	..	..	16	..	9 *16-in.*, 12 *6-in.*, 6 *4·7-in.* A.A.; 4 *3-pr.*, 6 *2-pr.*; 5 M.; 10 L.	2 (sub.)	23	— / 3750	1360
b.	**Queen Elizabeth** 1935 *See p.* P27.	31,100	644¼	‡104 0	31 3	75,000 B. & W.	Portsm'th	Wallsend . P.T.	1913	1915	2,943,000	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	2	25	— / 3400	1187

b.	**Ramillies** . 1941 *See p.* P26.		620½	‡101 6			Dalmuir .	Beardmore, P.T.	1916	1917	3,295,800	..	..	..	..	..	..	..	4			1010
b.	**Resolution** 1937 *See p.* P26.		620¼	‡101 4			Jarrow .	Palmer . P.T.	1915	1916	2,449,680	..	..	..	..	..	..	..	2			1012
b.	**Revenge** . 1937 *See p.* P26.	29,150	625¾	‡101 5	29 0	40,000 Y.	Barrow .	Vickers . P.T.	1915	1916	2,406,500	13–6	4–1	6	6–4	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4	23	— 3170	1104
b.	**Royal Oak** 1938 *See p.* P26.		620½	‡102 1			Devonp'rt	Hawthorn P.T.	1914	1916	2,468,269											1149
b.	**Royal Sovereign** 1936 *See p.* P26.		620¾	‡102 0			Portsm'th	Parsons . P.T.	1915	1916	2,570,929											1104
b.c.	**Renown** . 1940	32,000	794¼	102 4	25 6	112,000 B. & W.	Govan .	Fairfield . B.C.T.	1916	1916	3,111,284	6–3 K.C.	2	6–3	4–3	11–7 K.C.	6 K.C.	6 *15-in*, 15 *4-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	2† (sub.)	31·5	— 4250	1240
b.c.	**Repulse** . 1939 *See p.* P29.			102 6			Clydeb'nk	J. Brown . B.C.T.	1916	1916	2,760,062											
b.	**Rodney** . 1942 *See p.* P25.	33,900	710	106 0	30 0	45,000	Birkenh'd	Cammell Laird	1925	1927	6,414,653*	14	6¼	..	..	16	..	9 *16-in.*, 12 *6-in.*, 6 *4·7-in.* A.A; 4 *3-pr.*; 6 *2-pr.*; 5 M; 10 L.	2 (sub.)	23	— 3750	1315

* Total estimated cost of ship including guns. † Repulse has 8 a.w. tubes in addition. ‡ Over rubbers. ¶ Built at the charge of the Federated Malay States.

(*a*) Guns are in shields of 1-in. H.T. plating.

Battleship Iron Duke is retained as a gunnery firing ship in accordance with the London Naval Treaty.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME. DATE FOR SCRAPPING.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement (War).
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Valiant** . 1939 *See p.* P27.	31,100	639¾	104‡0	31 3	75,000 B. & W.	Govan .	Fairfield . B.C.T.	1914	1916	2,537,037*	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	2 (sub.)	25	— / 3400	1136
b.	**Warspite** . 1935 *See p.* P27.	31,100	644½	104‡0	31 3	75,000 B. & W.	Devonp'rt	Hawthorn P.T.	1913	1915	2,518,360*	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4 (sub.)	25	— / 3400	1130

* Total estimated cost of ship, including guns.

‡ Over rubbers.

The dates placed under the names of ships indicate the years in which they are to be scrapped according to the Washington Treaty. Fleet target ship Centurion, converted from battleship.

GREAT BRITAIN.—Cruising Ships, &c.

Class.	NAME.	Standard Displacement.	Length (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement (War).
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
Cr.	Leander See p. P35.	7,000	547 (on W.L.)	55 2	16	72,000	Devonp'rt	Vickers-Armstrongs	1931		..	..	..	8 6-*in.*, 4 4-*in.* A.A.	..		..	..
Cr.	Achilles						Birkenhead	Cammell Laird										
Cr.	Neptune	7,000	..	..	..	..	Portsm'th	Parsons	..	..	..	..	..	6-*in.* guns	..	..	..	..
Cr.	Orion						Devonport	Vickers-Armstrongs										
M.Cr.	Adventure See p. P40.	6,740	521	59 0	14 5	40,000	Devonp'rt	Vickers	1924	1927	1,258,503 *	..	..	4 4·7-*in.* A.A., 4 3-*pr.*, 4 2-*pr.*, 2 M., 8 L. 310 mines	..	27¾	— / 1550	395
A.C.	Argus	14,450	567	75 9	21 0	20,000	Dalmuir	Beardmore T.	1917	1918	Purchased under construction	..	..	6 4-*in.* A.A., 4 3-*pr.*, 4 M., 10 L.	..	20·2	— / 2000	360
A.C.	Ark Royal	6,900	366	50 10	17 6	3000	Blyth	Blyth S. B. Co.	1914	1914	..	..	..	4 M., 10 L.	..	11	— / 500	139
Cr.	Berwick	10,000					Govan	Fairfield	1926	1928	2,054,208 *	..	..					
Cr.	Cornwall	10,000	630	68 4	16 3	80,000	Devonp'rt	Beardmore	1926	1928	2,252,110 *	..	..	8 8-*in.*, 4 4-*in.* A.A., 4 3-*pr.*, 4 2-*pr.*, 4 M., 8 L.	8	31½	— / 3200	685
Cr.	Cumberland See p. P37.	10,000					Barrow	Vickers	1926	1928	1,960,821 *	..	..					
A.C.	Courageous See p. P30.						Walker (Armstr'g)	Parsons P.T.(G.)		1928	1,785,940 (*a*) 2,115,944 (*b*)	3	9-7					
A.C.	Glorious See p. P30.	22,500	786½	89 10	22 3	90,000 Y.	Belfast	Harland & Wolff T.(G.)	1916	1930	2,119,066 (*a*) 2,137,374 (*b*)	3	9-7	16 4·7-*in.*, 4 3-*pr.*, 4 2-*pr.*, 4 M., 42 L.	..	31	— / 3250	750
P. L. Cr.	Comus See p. P43.	3895	446½	41 9	13 6	40,000	Newcastle (Swan Hunter)	Wallsend Engn'g Co. P.T.	1914	1915	380,583	3 / —	..	4 6-*in.*, 2 3-*in.* A.A., 4 3-*pr.*, 2 2-*pr.* Pom Poms; 1 M.; 8 L.	4	29	— / 917	368

* Total estimated cost of ship, including guns.

(*a*) First cost of ship as a cruiser.
(*b*) Estimated cost of reconstruction as aircraft carrier.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement (War).
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
P. L. Cr.	Cairo						Birken-head	Cammell Laird T.(G.)	1918	1919	794,529							
" "	Calcutta						Barrow	Vickers T. (G.)	1918	1919	851,988							
" "	Capetown	4200	451¾	43 10	14 1	40,000	Birken-head	Cammell Laird T.(G.)	1919	1922	1,002,674	3 / —	..	5 6-*in.*, 2 3-*in* A.A., 4 3-*pr.*; 2 2-*pr.* Pom Poms; 2 M.; 8 L.	8	29	— / 950	415
" "	Carlisle						Govan	Fairfield T. (G.)	1918	1918	669,216							
" "	Colombo *See p.* P42.						Govan	Fairfield T. (G.)	1918	1919	692,308							
" "	Caledon						Birken-head	Cammell Laird T.(G.)	1916		547,300							
" "	Calypso	4180	450	43 1	14 1	40,000	Newcastle (Hawth'n)	Hawthorn Leslie T. (G.)	1917	1917	529,190	3 / —	..	5 6-*in.*, 2 3-*in.* A.A., 4 3-*pr.*; 2 2-*pr.* Pom Poms; 2 M.; 8 L.	8	29	— / 935	420
" "	Caradoc *See p.* P42.						Green'ck	Scotts' T. (G.)	1916		534,583							
" "	Champion						Newcastle (Haw-thorn)	Hawthorn P.T. (G.)	1915	1915	409,609							
" "	Cambrian						Pem-broke	Cammell Laird T.	1916	1916	493,518							
" "	Canterbury	3920	446½	41 9	13 6	40,000	Clyde-bank	J. Brown T.	1915	1916	300,000†	3 / —	..	4 6-*in.*, 2 3-*in.* A.A., 4 3-*pr.*, 2 2-*pr.*, Pom Poms; 1 M.; 8 L. [Champion 1 3-*in.* A.A.	2 sub.	29	— / 841	368
" "	Castor						Birken-head	Cammell Laird T.	1915	1915	358,300							
" "	Constance *See p.* P43.						Birken-head	Cammell Laird T.	1915	1916	374,270							

P. L. Cr.	Cardiff						Govan	Fairfield T. (G.)	1917	1917	542,507							
" "	Ceres						Clydebank	J. Brown T. (G.)	1917	1917	529,248							
" "	Coventry	4290	450	43 9	14 1	40,000	Newcastle (Swan Hunter)	Swan Hunter T. (G.)	1917	1918	586,182	3/—	..	5 *6-in.*, 2 *3-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms; 2 M.; 8 L. [Cardiff, Ceres } 2 *3-pr.*]	8	29	—/950	430
" "	Curacoa						Pembroke	Harland & Wolff T. (G.)	1917	1918	794,201							
" "	Curlew *See p.* P42.						Barrow	Vickers P.T. (G.)	1917	1917	544,436							
" "	Centaur	4120	446⅓	42 3	13 6	40,000	Elswick	Vickers T.	1916	1916	300,000*	3/—	..	4 *6-in.*, 2 *3-in.*, A.A., 2 *3-pr.*, 2 *2-pr.* Pom Poms; 2 M.; 8 L.	2 sub.	29	—/820	437
" "	Concord *See p.* P42.						Elswick	Vickers T.										
" "	Despatch						Govan	Fairfield T. (G.)	1919	1922	1,014,178							
" "	Danae						Elswick	Armstrong T. (G.)	1918	1918	701,600							
" "	Dauntless						Jarrow	Palmer T. (G.)	1918	1918	750,025							
" "	Dragon	4850	472¾	46 9	14 3	40,000	Green'ck	Scotts' T. (G.)	1917	1918	690,083	3/—	Shields	6 *6-in.*, 3 *4-in.* A.A., 2 M., 4 *3-pr.*, 8 L., 2 *2-pr.* Pom Poms.	12	29	—/1050	460
" "	Delhi						Elswick	Armstrong T. (G.)	1918	1919	785,145							
" "	Durban *See p* P41.						Green'ck	Scott T. (G.)	1919	1921	994,302							
Cr.	Devonshire *See p.* P34.	10,000	630	66 0	17 0	80,000	Devonp'rt	Vickers P.T.	1927	1929	2,007,275	..	..	8 *8-in.*, 4 *4-in.* A.A., 4 *3-pr.*, 4 *2-pr.*, 4 M., 8 L.	8	32¼	—/3200	685
Cr.	Dorsetshire *See p.* P34.	10,000	633	66 0	17 0	80,000	Portsmouth	Cammell Laird	1929	1930	2,101,951	..	..	8 *8-in.*, 4 *4-in.* A.A., 4 *3-pr.*, 4 *2-pr.*, 4 M., 8 L.	8	32¼	—/3200	685
A.C.	Eagle, *ex*-Almirante Cochrane. *See p.* P32	22,600	667½	105 2	21 11	50,000	Walker	J. Brown T.	1918 As a battleship.	1924 As an aircraft carrier.	3,310,042	.	..	9 *6-in.*, 5 *4-in.* A.A., 4 *3-pr.*, 4 M., 10 L.	..	24	—/3750	746

* Estimated cost as originally designed.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement (War).
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
A.C. . .	Furious . . See p. P31.	22,450	786½	90 1	21 6	90,000	Walker (Armstrong)	Wallsend Engn'g Co. T.(G.)	1916	1917	1,920,000†	3 / —	7	10 5·5-*in.*, 6 4-*in.* A.A., 4 3-*pr.*, 4 2-*pr.*, 4 M., 10 L.	..	31	— / 4025	710
P. L. Cr. .	Effingham .	9770	605	65 1	17 3	65,000	Ports-mouth	Harland & Wolff. T.	1921	1925	2,138,999	3 / —	Shields	7 7·5-*in.*, 3 4-*in.* A.A., 4 3-*pr.*, 2 2-*pr.*; 2 M.; 8 L. [Frobisher, 4 4-*in.* A.A.]	5 (1 sub.)	30·5	— / 2150	713
P. L. Cr. .	Frobisher . . See p. P39.	9860					Devon-port	Wallsend Eng. Co. T.	1920	1924	2,035,915†				6 (2 sub.)	30·5		715
P. L. Cr. .	Enterprise .	7580	570	54 9	16 6	80,000	Clyde-bank	John Brown T.(G.)	1919	1926	1,690,658*	3-1½ / 1	..	7 6-*in.*, 3 4-*in.* A.A., 4 3-*pr.*, 2 2-*pr.* Pom Poms; 2 M.; 8 L.	16	33	— / 1700	577
P. L. Cr. .	Emerald . . See p. P38.	7550		54 7			Elswick	Armstrong T.(G.)	1920	1926	1,474,235*							
Cr. . .	Exeter . . See p. P36.	8,400 8390	575	58 0	17 0	80,000	Devonp'rt	Parsons .	1929	1931	1,837,415*	..	..	6 8-*in.*, 4 4-*in.* A.A., 4 3-*pr.*, 2 2-*pr.*, 4 M., 8 L.	6	32¼	— / 1900	..
P. L. Cr. .	Hawkins . . See p. P39.	9,800	605	65 1	17 3	55,000	Chatham	Parsons Co. T.(G.)	1917	1919	1,599,741	3 / —	Shields	7 7·5-*in.*, 4 4-*in.* A.A., 4 3-*pr.*, 2 2-*pr.* Pom Poms; 2 M., 8 L.	6 (2 sub.)	29½	— / 2680	747
A.C. . .	Hermes . . See p. P33.	10,850	599½	‡70 3	18 7	40,000	Elswick .	Parsons Co. T.(G.)	1919	1924	2,030,263*	..	..	6 5·5-*in.*, 3 4-*in.* A.A., 4 3-*pr.*, 2 2-*pr.* Pom Poms; 4 M., 10 L.	..	25	— / 2000	531
Cr. . .	Kent . . See p. P37.	10,000 9250	630	68 4	16 8	80,000	Chatham	Hawthorn Leslie	1926	1928	2,128,950†	..	..	8 8-*in.*, 4 4-*in.* A.A., 4 3-*pr.*, 4 2-*pr.*, 4 M., 8 L.	8	32	— / 3200	685
Cr. . .	London . . See p. P34.	10,000 9750	630	66 0	17 0	80,000	Ports-mouth	Fairfield P T.	1927	1929	2,029,949*	..	..		8	32¼	— / 3200	685

Cr. .	**Norfolk** . . *See p.* P34.	10,000	633	66	0	17	0	80,000	Fairfield	Fairfield .	1928	1930	2,141,961*	..	..	8 *8-in.*, 4 *4-in.* A.A., 4 *3-pr*, 4 *2-pr.*, 4 M., 8 L.	8	32¼	—/3200	685
Cr. .	**Shropshire** . *See p.* P34.	10,000	633	66	0	17	0	80,000	Dalmuir .	Beardmore	1928	1929	1,941,950†	..	..					
Cr. .	**Sussex** . . *See p.* P34.	10,000	630	66	0	17	0	80,000	Hawthorn Leslie .	Hawthorn Leslie .	1928	1929	1,975,800†	..	..	8 *8-in.*, 4 *4-in.* A.A., 4 *3-pr.*, 4 *2-pr.*, 4 M., 8 L.	8	32¼	—/3200	685
Cr. .	**Suffolk** . *See p.* P37.	10,000	630	68	4	16	3	80,000	Portsmouth	Parsons .	1926	1928	2,180,240†	..	..		8	31½	—/3200	685
P. L. Cr. .	**Vindictive** . *See p.* P39.	9,996	605	65	1	17	3	60,000	Belfast	Harland & Wolff. T. (G.)	1918	1918	1,671,712	3/—	Shields	6 *7·5-in.*, 3 *4-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms; 2 M., 8 L.	6 (2 sub.)	30	800/1420	720
Cr. .	**York** . . *See p.* P36.	8,400	575	57	0	17	0	80,000 (G.)	Palmers'	Palmers' .	1928	1930	1,774,276	..	..	6 *8-in.*, 4 *4-in.* A.A., 4 *3-pr.*, 2 *2-pr.*, 4 M., 8 L.	6	32¼	—/1900	623

* Total estimated cost of ship, including guns. † Estimated cost, excluding armament and ordnance stores. ‡ Extreme breadth under water; 100 ft. over seaplane lifting rails.

Two "Leander" Class cruisers and one of about 5,000 tons are authorized (1931 Estimates).

Patrol Boats.—P.C. 74, Dart (1918), 610 tons, 20 knots, 1 4-in., 2 12-pr.; P.59 (1917), P.40 (1916), Spey (1917), 560 tons, 20 knots, 1 4-in., 1 2-pr.

Training Ships.—Erebus, 7,200 tons; Terror, 7,200 tons; Marshal Soult, 6,400 tons.

Fishery Protection Gunboats (ex-trawlers).—Colne, Doon, Dee, Garry, Kennet, Liffey, 490–550 tons.

Destroyer Depôt Ships.—Greenwich, Sandhurst.

Submarine Depôt Ships.—Lucia, Titania, Alecto, Adamant, Dolphin, Cyclops. Medway, built at Vickers', completed 1929, displacement 15,000 tons, speed 15 knots, armament 2 4-in., 4 4-in. A.A. One more was authorised for commencement under the 1928-29 Estimates, the Maidstone, but construction was cancelled 24/7/1929.

Repair Ships.—Assistance. Resource, built at Messrs. Vickers; completed 1930, displacement 13,500 tons, speed 15 knots, armament 4 4-in. A.A.

Minelayers.—Medea, Medusa, Melpomene, Minerva, Vernon, Kate Lewis.

Surveying Vessels.—Beaufort, Fitzroy, Flinders, Kellett, Herald, Ormonde, Iroquois, Endeavour.

Netlaying Vessel.—One netlayer, named Guardian, was commenced at Chatham in 1931.

Mining School Tender.—Nightingale building at Portsmouth, displacement 255 tons, horse-power 400. speed 10 knots, coal capacity 15 tons.

Research Ship.—Challenger, completed at Chatham in October, 1931.

Defence Forces of the Dominions.

ROYAL AUSTRALIAN NAVY.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal. / Oil	Complement (War)
		tons.	ft.	ft. in.	ft. in.						£	in.	in.			knots	tons.	
Cr.	Australia	10,000	630	68 4	16 3	80,000	Brown	Brown	1927	1928	..	..	..	8 8-in., 4 4-in. A.A., 4 3-pr., 4 2-pr. 4 M., 12 L.	8	31½	— / 3200	685
"	Canberra. See p. P37.						Clyde-bank											
L. Cr.	Adelaide See p. 41.	5100	462½	50 1	15 10	25,000	Sydney	Sydney	1918	1922	..	..	..	9 6-in., 4 3-pr., 2 M. 1 3-in. A.A., 10 L.	2 (sub)	25	951 / 558	450
L. Cr.	Brisbane	5120	457	49 10	15 9	25,000	Sydney	Vickers T.	1915	1916	..	3 / —	..	8 6-in., 4 3-pr., 2 M., 1 3-in. A.A., 8 L.	2 (sub.)	25·5	1196 / 260	490
Seaplane Carrier	Albatross	5000	443¾	61 0	15 6	12,000	Cockatoo Island	—	1928	1929	—	—	—	4 4·7-in. A.A., 4 2-pr. Pom Pom, 4 3-pr 4 M., 10 L., 9 sea-planes	—	21	— / 1000	350
Flot. Ldr.	Anzac	1310	327½	31 10	11 1	36,000	Dumbarton	Denny T.	1917	1917	—	—	—	4 4-in. Q.F., 2 2-pr. A.A. 1 M., 4 L.	4	34	515 Oil	146

DESTROYERS.—"*S*" *Class*:—Stalwart, Success, Swordsman, Tasmania, Tattoo. Completed, 1919; Displacement, 905 tons; 27,000 H.P.; speed, 36 knots; armament, three 4-in., one 2-pdr., 2 double torpedo tubes.

SUBMARINES.—Oxley and Otway, built by Messrs. Vickers, completed 1927, displacement $\frac{1400}{1835}$ tons, 15½ knots surface, 9 knots submerged; armament, one 4-in., one smaller gun; eight torpedo tubes. Transferred to the Royal Navy, 1931.

SLOOPS.—"*Flower*" *Class*:—Marguerite, Geranium (1916), 1,175 tons; speed, 16·5 knots; armament, 1 *4*-in., 2 *3*-pr.; Mallow (1915), 1,165 tons, 1 *12*-pr., 1 *3*-pr. A.A.

Surveying vessel Moresby (late Silvio) 1650 tons, length 267½ ft., 2,500 H.P., 17 knots, one 3-pr.

Submarine depôt and fleet repair ship: Penguin (late Platypus). Displacement 3,450 tons; completed 1917.

NEW ZEALAND NAVY.

Light Cruisers—"*D*" *Class*:—Dunedin [p. P41]; completed, 1919 (Elswick). Diomede [p. P40]; completed 1922 (Vickers). Displacement, 4,850 tons; 40,000 H.P.; speed, 29 knots; armament, 6 6-in., 3 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 2 M., 4 triple torpedo tubes; max. fuel, 1,050 tons oil; complement, 450.

ROYAL CANADIAN NAVY.

Destroyers.—Champlain and Vancouver. Completed, 1919 (Thornycroft). Displacement, 905 tons; 29,000 H.P.; speed, 36 knots; armament, 3 4-in., 1 2-pr., 4 21-in. tubes; oil, 305 tons (radius of action, 2,000 at 15 knots). Saguenay and Skeena completed at Thornycroft's in 1931; displacement 1330 tons; speed, 35 knots; armament, 4 4·7-in., 2 2-pr., 2 quad. torpedo tubes.

SOUTH AFRICA.

Surveying Ship.—"*Beaufort*" *Class*:—Protea (ex-Crozier). Twin-screw mine-sweeper, converted 1919. Displacement, 710 tons; 2,200 H.P.; speed, 16 knots; coal capacity, 185 tons; armament, one 3-pr. Transferred to South Africa, September, 1921.

ROYAL INDIAN MARINE.

Minesweeping Sloops.—Clive, 2,021 tons; 1,700 H.P.; 2 4-in., 2 12-pdr., 4 3-pdr. guns; launched Beardmore, 1919. Lawrence, 1,259 tons; 1,900 H.P.; 2 4-in., 2 12-pdr., 4 3-pdr. guns; launched Beardmore. 1919. Hindustan, Swan Hunter (1930). Displacement 1,190 tons; speed 16 knots; 2 4-in. guns.

Sloop.—Cornwallis, 1,290 tons; 2,500 H.P.; 3 4-in., 2 12-pdr., 4 3-pdr. guns (launched Hamilton, 1917, as the Lychnis).

Surveying Ships.—Investigator, 1,172 tons; 1,550 H.P.; no guns. Palinurus, 444 tons; 475 H.P.; no guns. Both completed 1907.

Patrol Boats.—Baluchi, 682 tons; Pathan, 695 tons; both 3,500 H.P., and 1 4-in. and 2 12-pdr. guns; completed, 1917 and 1918.

ARGENTINE REPUBLIC.

Class.	Name.	Standard Displacement.	Length. (Extreme).	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Armament. Guns	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c. / c. / c.	Almirante Brown / Vintecinco de Mayo / 1 vessel . . . . See p. P45.	6495	515¾	58	15¼	85,000	Leghorn . / Genoa . / Projected .	1929	1931	1,250,000	..	..	..	..	..	..	6 *7·5-in.*, 12 *4-in.* A.A., 6 Pom Poms	6	32	— / 2000	600
a.c.	Garibaldi * . .	6840	328	59¾	24	13,384	Sestri Ponente	1895	1896	752,000	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 10 *6-in.*, 6 *4·7-in.*, 2 *3-in.*, 4 *6-pr.*	..	19·9 †	1137 / —	414
a.c.	General Belgrano†	6840	328	59¾	24	13,000	Leghorn .	1897	1899	696,700	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	1 *10-in.*, 8 *6-in.*, 4 *3-in.*, 4 *6-pr.*	..	20·1 †	..	515
a.c.	General San Martin †	6773	328	59¾	24	13,000	Leghorn .	1896	1898	688,200	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	1 *8-in.*, 8 *6-in.*, 6 *4·7-in.*	..	19·8	..	431
b.	Moreno . . / Rivadavia . See p. P44.	27940	585	95½	28	45,000	Camden, N.J. (N.Y.S.B.Co.) / Quincy, Mass.	1911	1915 / 1914	2,200,000	12–10 K.S.	3–2	9–6 K.S.	9 K.S.	12–9 K.S.	6 K.S.	12 *12-in.*, 12 *6-in.*, 4 *3-in.* A.A., 4 *3-pr.*; 6 M., 4 L.	4 (sub.)	22·5	— / 4200	1046
a.c.	Pueyrredon † . .	6840	328	59¾	24	13,000 B.	Sestri Ponente	1898	1901	782,000	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	1 *10-in.*, 8 *6-in.*, 2 *3-in.* A.A.	..	20·1 †	..	430

Moreno and Rivadavia were converted to oil burning and fitted with geared turbines in 1925.

The old coast-defence ironclads Libertad and Independencia, 2300 tons, completed at Birkenhead in 1892–93, and converted to oil fuel in 1927, carry two 9·4-in., four 4·7-in., and six 3-pr. guns. The Libertad is unserviceable at present, but is being refitted.

Cruiser Buenos Aires (Elswick, 1895), 4780 tons, four 6-in., six 4·7-in., twelve 3-prs., 13,000 H.P., 23·2 knots on trial. River gunboats Paraná and Rosario (Elswick, 1909), 1055 tons, two 6-in. howitzers, six 12-pr., 8 M., 2 L., 15 knots. For destroyers, see Flotilla Tables.

The training-ship (cruiser) Presidente Sarmiento, 2850 tons, 15 knots; two 4·7-in., two 4-in., four 6-pr., two 3-pr. There are 13 transports and many auxiliaries.

Two sloops, San Juan and San Luis, built in England at Hawthorn & Leslie's, Newcastle, 790 tons, 12 knots, for survey purposes. Completed 1928, carry one 3-in.

Two tugs, Mataco, Toba completed 1928, at Messrs. Hawthorn & Leslie's, Newcastle.

Three sloops, two transports and four coastguard vessels are projected.

* Training ship. † Converted to oil burning and armament altered in 1929.

BRAZIL.

Class.	NAME.	Standard Displacement.	Length. (Extreme).	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkheads.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s., t.	**Floriano**	3162	267½ p.p.	48	13¼	3400 D'A.	La Seyne	1899	1901	..	13¾–4 H.S.	1½	..	..	8 H.S.	3 H.S.	2 *9·4-in.*, 4 *4·7-in.*, 2 M., 4 *6-pr.*, 2 *1-pr.*	2 (sub.)	15·0	236 / —	260
b.	**Minas Geraes** *See p.* P46.	19,281	543	83	25	27,212 *t* B.&W.	Elswick	1908	1909	1,821,400	9–6–4 K.S.	2	9–6–4 K.S.	9	12–8 K.S.	9 K.S.	12 *12-in.*, 22 *4·7-in.*, 8 *3-pr.*, 2 *3-in.* A.A.; 4 M.	—	21·5 *t*	2360 / 350	850
b.	**São Paulo** *See p.* P46.	19,281	543	83	25	28,645 *t* B.&W.	Barrow	1909	1910	1,821,400	9–6–4 K.S.	2	9–6–4 K.S.	9 K.S.	12–8 K.S.	9 K.S.	12 *12-in.*, 22 *4·7-in.*, 8 *3-pr.*, 2 *3-in.* A.A.; 4 M.	—	21·5 *t*	2360 / 350	850

LIGHT CRUISERS:—Bahia and Rio Grande do Sul, completed at Elswick, 1910, reconstructed, including conversion to oil fuel, at Rio de Janeiro, 1926, 3100 tons, ten 4·7-in., four 3-pr. guns, 2 twin torpedo tubes, 20,000 H.P., 27 knots; Barroso (Elswick, 1897), 3450 tons, six 6-in., four 4·7-in., four 6-pr., 8 M., 2 L. guns, 20 knots. Two river gunboats, Missões, 200 tons, 11 knots; Oyapock, 195 tons, 14 knots.

MINELAYERS:—Maria do Couto, Carneiro da Cunha, Heitor Perdigao and Muniz Freire.

Also river monitors Espirito Santo (*ex* Maranhao) and Pernambuco (470 tons, 11 knots), built at Rio de Janeiro. The Espirito Santo is being converted into a gunboat scout at Rio de Janeiro.

SUBMARINE TENDER:—Ceará (Spezia, 1916), 4000 tons, 4100 H.P., 14 knots, four 4-in. guns and two smaller.

FLEET COLLIER:—Belmont, 5227 tons gross.

CHILE.—Armoured Ships.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Almirante Latorre * (*ex* Canada) *See p. 47.*	28,000	661	92 6	29 0	37,000 P. tur. Y 2	Elswick	1913	1915	..	9–4 A.I.	4–2½	4½	..	10	6	10 *14-in.*, 14 *6-in.*, 2 *3-in.*, A.A., 4 *3-pr.*	4 (sub.)	23	3300 / 520	1000
a.c.	O'Higgins	8,500	412 p.p.	62 9	22 0	16,000 B.	Elswick	1897	1898	..	7–5	2	..	..	7½–6	6	4 *8-in.*, 10 *6-in.*, 12 *3-in.*, 4 M.	2 (sub.)	21·5 *t*	1200 / —	500
b.	Capitan Prat †	6,900	328 p.p.	60 9	22 9	12,000	La Seyne	1890	1893	391,000	12	3	4	..	10½	2	4 *9·4-in.* (Canet), 8 *4·7-in.* (Canet), 8 *6-pr.*, 11 M.	2	18·3 *t*	775 / —	500

* Fitted with bulges and modernized in England (completed 1931). † Submarine parent ship.

Cruising Ships, &c.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						in.	in.			knots.	tons.	
cr.	Blanco Encalada	4400	370 p.p.	46 6	19 6	14,500	Elswick	1893	1894	..	4–1¾	..	2 *8-in.*, 8 *6-in.*, 4 *3-in.*	2	22·78 *t*	850 / —	385
„	Chacabuco	4500	360 p.p.	46 6	17 0	15,500	Elswick	1901	1903	..	4½–1¾	..	2 *6-in.*, 10 *4·7-in.*, 4 *3-in.*	2 (sub.)	24·0	1000 / —	400
„	Ministro Zenteno	3420	330½ p.p.	43 9	16 9	6500	Elswick	1896	1898	..	..	..	8 *6-in.*, 4 *3-in.*, 8 M.	2	20·0	840 / —	300

OILERS (Armstrongs, 1930): Maipo, 4,686 tons gross; Rancagua, 6,210 tons gross. Coastguard vessels: Orompello, Leucoton, Elicura, Colocolo, 530 tons; Aguila, 820 tons; Porvenir, 450 tons. Submarine depôt ship: 1 built at Vickers-Armstrongs, Barrow, the Araucano, completed 1930; displacement 6,500 tons; armament two 4·7-in.; length b.p. 390 ft.; beam 55 ft.; draught 16 ft. 6 ins.; speed 13 knots; H.P. 2,500. Two cruisers are projected.

DENMARK.—Armoured Ships.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)		Beam.		Draught.		Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Fuel.	Complement.
														Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Guns.	Torpedo Tubes.		Coal. Oil.	
		tons.	ft.	ins.	ft.	ins.	ft.	ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.,t.	**Herluf Trolle** .	3595	283	9	49	6	16	6	4400 t	Copenhagen	1899	1901	..	7–4 H.S.	8	..	..	7 H.S.	6 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 6 *3-in.*, 2 *6-pr.* A.A., 2 M.	3 (sub.)	16·0	250 / —	256
c.d.s.,t.	**Niels Juel** .	4100	295	4	53	6	15	9	5500	Copenhagen	1918	1923	..	8–4 K.S.	2	..		..	2 K.S.	10 *5·9-in.*, 2 *6-pr.*, 2 *3-in.* A.A.	2 (sub.)	17·0	240 / 250	309
c.d.s.,t.	**Olfert Fischer** .	3650	283	9	50	6	16	9	4600 t	Copenhagen	1903	1905	..	7–4 K.S.	3	..	..	7 K.S.	6	2 *9·4-in.*, 4 *5·9-in.*, 6 *3-in.*, 2 *6-pr.* A.A., 2 *1-pr.*, 2 M.	3 (sub.)	16·0	250 / —	256
c.d.s.,t.	**Peder Skram** .	3735	286	7	51	6	16	3	5400	Copenhagen	1908	1909	..	8–4 K.S.	2	..	..	7 K.S.	6 K.S.	2 *9·4-in.*, 4 *5·9-in.*, 8 *3-in.*, 2 *1-pr.*, 2 *3-in.* A.A., 2 M.	4 (sub.)	16·0	250 / —	262

Mine-layers Lossen, Minekran IV–VI, Mining boats 1–10. **Fylla** (ex-British sloop Asphodel), and 5 other fishery inspection vessels. Groensund, torpedo boat repair ship; Hekla, submarine depôt ship. Submarine depôt and repair ship Henrik Gerner completed 1928, displacement 490 tons, 900 H.P., 13 knots carries two 3-in. guns. Fishery inspection vessel Aegir building for Iceland Government.

Surveying vessels Marstrand and Willemoes, 169 tons, 11 knots.

FRANCE.—Armoured Ships.

Class.	NAME. Date for Scrapping under Washington Treaty.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Bretagne** . 1934 *See p.* P48.	22,189 / 23,128*	544 6	88 6	29 0	29,000 N. tur.	Brest .	1913	1915	2,589,439	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *3-in.* A.A., 5 *3-pr.*, 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2700 / 300	1167
b.	**Condorcet** . *See p.* P50.	17,597 / 18,592*	480 11	84 7	27 0	22,500 N. tur.	St. Nazaire	1909	1911	2,165,200	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.* A.A., 2 *1-pr.*, 2 L.	2 (sub.)	19·25	2100 / —	890
b.	**Courbet** . . 1930 *See p.* P49.	22,189 / 23,128*	544 6	88 6	29 0	28,000 N. tur.	Lorient .	1911	1913	2,508,388	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 3 *3-pr.*, 4 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2450 / 250	1140
b.	**Diderot** . . *See p.* P50.	17,597 / 18,592*	480 11	84 7	27 0	22,500 N. tur.	St. Nazaire	1909	1911	2,167,000	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.* A.A., 2 *1-pr.*, 2 L.	2 (sub.)	19·25	2100 / —	890
a.c.	**Ernest Renan** *See p.* P51.	12,234 / 13,500*	521 7	70 0	27 6	37,500 Nic., *t*	St. Nazaire	1906	1909	1,410,000	6¾–4 H.S.	2	5–3 H.S.	4¾	6 H.S.	5 H.S.	4 *7·6-in.*, 12 *6·5-in.*, 2 *3-in.* A.A., 4 *3-in.*, 8 *9-pr.*, 2 *1-pr.*	2 (sub.)	24·4 *t*	1870 / —	874
b.	**Jean Bart** 1930 *See p.* P49.	22,189 / 23,128*	544 6	88 6	29 0	28,000 B. tur.	Brest .	1911	1913	2,528,888	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*, 4 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2450 / 250	1140
a.c.	**Jules Michelet** *See p.* P51.	11,072 / 12,400*	489 0	70 3	27 0	29,000 Guyot	Lorient .	1905	1908	1,204,107	6–4 K.S.	2	5–3 K.S.	6 H.S.	8 K.S.	5 K.S.	4 *7·6-in.*, 12 *6·5-in.*, 2 *3-in.* A.A., 10 *3-pr.*, 2 M.	2 (sub.)	22·0	1870 / —	724

b.	**Lorraine** . 1936 *See p.* P48.	22,189 / 23,128*	544 6	88 6	29 0	29,000 tur. S. & cyl.	St. Nazaire	1913	1916	2,642,439	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *3-in.* A.A., 5 *3-pr.*, 2 *1-pr.*, 2 L.	4 (sub.)	20·0	..	1167
b.	**Paris** . . 1934 *See p.* P49.	22,189 / 23,128*	544 6	88 6	29 0	28,000 N. tur.	La Seyne .	1912	1914	2,603,920	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*, 4 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2450 / 250	1140
b.	**Provence** . 1935 *See p.* P48.	22,189 / 23,128*	544 6	88 6	29 0	29,000 tur.	Lorient .	1913	1915	2,589,000	11 7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *3-in.* A.A., 5 *3pr.*, 2 *1-pr.*, 2 L.	4 (sub.)	20·0	2700 / 300	1167
b.	**Voltaire.** . *See p.* P50.	17,597 / 18,592*	480 11	84 7	27 0	22,500 B. tur.	La Seyne .	1909	1911	2,169,200	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.* A.A., 2 *1-pr.*, 2 L.	2 (sub.)	19·25	2100 / —	890
a.c.	**Waldeck-Rousseau** . *See p.* P52.	12,617 / 13,828*	521 4	70 7	27 6	35,286 Nic. *t.*	Lorient .	1908	1911	1,301,380	6½–3½	2½	5	4¾	6	5½	14 *7·6-in.*, 10 *3-in.*, 10 *9-pr.* A.A., 2 *3-pr.*, 2 M.	2 (sub.)	23·0 *t*	1900 / —	874

* Displacement accepted at the Washington Treaty.

Lorraine refitted and converted to oil burning 1929. The armoured cruisers Condé, Gueydon (1903-4) are retained temporarily as Training Ships.
Paris completed reconstruction 1929.
A battleship of about 23,000 tons is projected.

FRANCE.—Cruising Ships, &c.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)		Beam.		Draught.		Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal / Oil	Complement.
		tons.	ft.	ins.	ft.	ins.	ft.	ins.					£	in.	in.			knots.	tons.	
training cruiser	**Jeanne d'Arc** *See p.* P55.	6,500	557	8	58	0	18	8	32,000	Penhoet Yard, St. Nazaire	1930	Bldg.	..	..	..	8 *6·1-in.*, 4 *3-in.* A.A., 2 *1·6-in.*, 2 M., 2 seaplanes, 2 catapults	2	26·5	..	..
cr.	**Algérie**	10,000	607	0	63	0	20	7	90,000	Brest	Bldg.	Bldg.	..	..	..	8 *8-in.*, 8 *3·5-in.* A.A., 8 *1·5-in.*	6	32	..	..
"	**Dupleix**										1930	Bldg.	..	..	..	8 *8-in.*, 8 *3-in.* A.A., 8 *1-pr.* A.A., 12 M., 3 seaplanes, 2 catapults. (Dupleix has 8 *3·5-in.* A.A.)	2 triple *21-in.*	32	..	605
"	**Foch**										1929	1930								
"	**Colbert** *See p.* P53.										1928	1930								
A.C.	**Bearn** * *See p.* 58.	22,146	597	1	89	0	29	10	37,000	Chantiers de la Mediterranée, La Seyne	1920	1928	..	3¼	..	8 *6·1-in.*, 6 *3-in.* A.A., 8 *1-pr.* A.A., 12 M. A.A., 41 planes	4	21·6	— / 2070	875
A.T.	**Commandant Teste**	10,000	548	0	88	7	23	6	21,000	Chantiers de la Gironde, Bordeaux	1927	Bldg.	..	2	1½ deck	12 *3·9-in.* A.A., 8 *1-pr.* A.A., 12 M., 20 planes	..	20·5	..	648
cr.	**Suffren** *See p.* P53.	10,000	607	0	63	2	19	3	90,000	Brest	1927	1929	..	..	..	8 *8-in.*, 8 *3·5-in.* A.A., 8 *1-pr.* A.A., 12 M., 3 seaplanes, 2 catapults	2 triple *21-in.*	33	— / 1800	605
"	**Tourville**	10,000	626	8	62	4	19	6	130,000	Lorient	1926	1928	..	..	..	8 *8-in.*, 8 *3-in.* A.A., 8 *1·5-in.*; 2 seaplanes	2 triple *21-in.*	33·2	— / 2000	590
"	**Duquesne** *See p.* P53.									Brest	1925									
"	**Duguay-Trouin** *See p.* P54.	7249	594	10	56	6	17	0	110,000	Brest	1923	1926	..	..	..	8 *6·1-in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 M., 1 L., 2 seaplanes, 1 catapult	4 triple	33·4 *t*	— / 1480	574
"	**La Motte Picquet** *See p.* P54.	7249	594	10	56	6	17	0	100,000	Lorient	1924	1926	..	..	..	8 *6·1 in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 M., 1 L., 2 seaplanes	4 triple	33·1 *t*	— / 1480	574
"	**Metz** (*ex*-Königsberg) *See p.* P56.	5265	496	11	47	0	16	6	36,400	Bremen (Weser)	1915	1916	..	2½	1	8 *5·9-in.*, 2 *3-in.* A.A., 4 M.	2 sub. 2 a.w.	27	1270 / 500	433

cr.	**Mulhouse** (*ex*-Stralsund) *See p.* P57.	4527	455	0	44	0	16	9	24,200 *t* (tur.)	Bremen(Weser)	1912	1913	416,340	4–2½	2	7 *5·9-in.*, 2 *3-in.* A.A., 2 M.	2	26·75 *t*	1200 / 130	454
,,	**Primauguet** *See p.* P54.	7249	594	10	56	6	17	0	110,000	Brest	1924	1926	..	..	..	2 *6·1-in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 M., 1 L., 2 sea-planes	4 triple	33·1 *t*	— / 1480	574
,,	**Strasbourg** (*ex*-Regensburg) *See p.* P56.	4723	468	1	45	0	17	0	26,000 (P. tur.)	Bremen(Weser)	1914	1914	417,810	4–2⅜	2	7 *5·9-in.*, 1 *3-in.* A.A., 4 M.	4	26·0	1200 / 380	438
,,	**Thionville** (*ex*-Novara) *See p.* P57.	2922	428	7	42	0	15	6	25,000 (tur.)	Fiume	1913	1914	..	2⅜	..	9 *3·9-in.*, 2 *3-in.* A.A., 1 M.	2 twin	27·0	800 / —	430

Two 7,500 cruisers are projected, La Galissoniese and Jean de Vienne.

* Originally designed as battleship.

River Gunboat.—Francis Garnier, completed 1929, 750 tons, 15 knots, mounting two 4-in., one 3-in. A.A., two 2-pr., 4 M.

Minesweepers.—Vaillante, Conquérante completed 1918, 424 tons, 17 knots, mounting two 3·9-in. guns; Luronne, completed 1917, 295 tons, 13·8 knots, mounting two 3·9-in. guns; Impétueuse, Batailleuse, Audacieuse, completed 1917, 348 tons, 15 knots, mounting two 3·9-in. guns; Éveillé, Engageante, completed 1917, 360 tons, 17 knots, mounting two 3·9-in. guns; Agile, Inconstant, Ardent, completed 1916, 354 tons, 17 knots, mounting two 3·9-in., three 1-pr. A.A.; Sans-Souci, Étourdi, Alerte, completed 1916, 354 tons, 17 knots, mounting two 3·9-in. guns; Gracieuse, Capricieuse, Dédaigneuse, Malicieuse, Topageuse, Diligente, Surveillante, completed 1916, 348 tons, 15 knots, mounting two 3·9-in. guns; Granit, Mica, Porphyre, Meulière, Quartz, completed 1918, 394 tons, 12·5 knots, mounting one 9-pr. gun. One minesweeper netlayer authorised for commencement in 1931, 2,290 tons.

Cruiser-Minelayers.—Pluton, completed 1931, 5,215 tons, 30 knots, mounting four 5·4-in., ten 1-pr. A.A., 12 M., 1000 mines. Emilé Bertin, building, 5,890 tons, nine 6-in. guns, 36 knots; Castor, 3,150 tons, 3 3·9-in., 2 1·5 A.A.; Pollux, 2,460 tons, completed 1930.

Submarine Parent Ship.—Jules Verne, building, 5,904 tons, 16 knots, mounting four 3·5-in. A.A., four 1·5-in. A.A.

Sloops.—Bougainville, Dumont D'urville, Savargnan de Brazza, and d'Entrecasteaux, building, 1970 tons, 3,200 H.P. (Diesel). 15·50 knots, armament three 5·1-in., four 1-pr. A.A., 6 M., 1 seaplane. Ville d'Ys, completed 1917, 1,378 tons, 17·5 knots, mounting three 3·9-in., three 3-in., two 3-pr., 2 M.; Régulus, Cassiopée, completed 1917, 1,378 tons, 17 knots, mounting two 5·5-in., two 3-in. A.A., 2 M.; Antares, Aldébaran, Bellatrix, Algol, Altair, completed 1916, 1378 tons, 17 knots, mounting two 5·5-in., two 3-in. A.A., 2 M. Two sloops authorized for commencement in 1931, and six more are projected.

Despatch Vessels.—Du Couedic, Enseigne Henry, Duperré, Duchaffault, Dubourdieu, completed 1919-1920, 512 tons, 17 knots, mounting one 5·5-in., one 3·9-in.; Mondemont, Montmirail, Remiremont, Baccarat, Bethune, Vitry-le-Francois, Lievin, Calais, Lassigny, Les Esparges, Vauquois, Vimy, Craonne, Dunkerque, Epinal, Nancy, Coucy, Laffaux, Amiens, Toul, Tahure, Arras, Bapaume, completed 1919–1924, 748 tons, 20 knots, mounting two 5·5-in., one 3-in. A.A., 2 M.; Escaut, Ailette, Ancre, Scarpe, Suippe, Meuse, Yser, Somme, Oise, Aisne, Marne, Quentin-Roosvelt, completed 1917–1919, 570–694 tons, 21 knots, mounting four 3·9-in., one–two 9-pr., one–three 3-pr.

One net-layer, 2,000 tons, is being built at Lorient. A second is projected.

GERMANY.—Armoured Ships.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Deutschland See p. P59.	10,000	about 590	about 67 6	about 19 0	54,000 Diesel	Deutsche Werke, Kiel	1931	Bldg.	about 4,000,000	about 5	—	—	—	—	—	6 *11-in.*, 8 *5·9-in.*, 4 *3·4-in.* A.A.	6 (a.w.)	26	— / 1200	—
b.	Ersatz Lothringen	—	—	—	—	—	Wilhelmshaven	—	Bldg.	about 3,750,000 (estimated)	—	—	—	—	—	—	—	—	—	—	—
b.	Hannover †	13,040	413 1	72 10	25 3	17,768 T.S. *t.*	Wilhelmshaven	1905	1907	1,157,500	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 4 *3·5-in.*, 4 *3·5-in.* A.A., 23 M.	4 (a.w.)	18·5 *t*	1771 / 197	727
b.	Hessen	12,997	413 5	72 10	25 3	16,000 T.S. & C.	Kiel (Germania)	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *22-pr.*, 23 M,	5 (1 sub. 4 a.w.)	18·0	1574 / 197	727
b. / b.	Schlesien † / Schleswig-Holstein †	13,040	413 1	72 10	25 3	19,465 *t* / 19,868 T.S.&C.*t*	Schichau / Germania	1906	1908	1,214,000	9½–4 K.S.	3	8 K.S.	6 K.S.	11–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *5·9-in.*, 20 *22-pr.*, 4 *3·5-in.*, 4 *3·5-in.* A.A. (Schlesien 2 *3·5-in.* A.A.)	4 (a.w.)	18·5 / 19·0 *t*	1771 / 197	727

* Formerly known as Ersatz Preussen. † Reconstructed 1926–30.

The old battleship Zahringen is fitted out as a distantly controlled target vessel. Modernization of Hannover completed 1930.

Two more armoured ships, Ersatz Braunschweig and Ersatz Elsass, are projected, but no money is yet voted for these.

GERMANY.—Cruising Ships, etc.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
l.c.	**Leipzig** . . *See p.* P61.	6000	543 10	53 5	15 7	72,000	Wilhelmshaven	..	1929	1931	2,100,000 (estimated)	..	..	9 *5·9-in.*, 4 *3·4-in.* A.A.	4 triple *19·7-in.*	32	— / 1500	..
l.c.	**Köln** . .						Wilhelmshaven	..	1928	1930	..	..	..					
l.c.	**Karlsruhe**	6000	570 10	49 10	17 8	65,000	Deutsche Werke, Kiel	..	1927	1929	..	..	..	9 *5·9-in.*, 4 *3·4-in.* A.A.	4 triple *19·7-in.*	32	— / 1200	500
l.c.	**Königsberg** *See p.* P60.						Wilhelmshaven	..	1927	1929	..	..	..					
l.c.	**Emden** . . *See p.* P62.	6000	510 2	46 11	17 4	46,500	Wilhelmshaven	..	1925	1925	..	..	..	8 *5·9-in.*, 2 *3·4-in.* A.A.	2 twin *19·7-in.*	29	1100 / 700	483
l.c.	**Hamburg*** .	3200	362 7	43 4	16 5	10,746 *t*	Vulcan, Stettin	..	1903	1904	..	..	..	8 *4·1-in.*, 18 M.	2 *19·7-in.*	22·6 *t*	846 / —	350

* Training Ship.

Gunnery Tenders Drache, Hay, Fuchs, and Delfin. Gunnery Tender Bremse (formerly known as Ersatz Drache) is under construction at Wilhelmshaven, 1425 tons, 339½ feet long, 31 ft. 2 in. beam, 25,000 H.P. (Diesel), 27 knots. A second new Gunnery Tender, Ersatz Hay, is authorized. Surveying vessel Meteor (1150 tons).

Fishery Protection vessels Weser and Elbe are building at Wilhelmshaven, 590 tons, 1600 H.P., 11½ knots.

GREECE.—Armoured Ships.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Giorgios Averoff** * *See p.* P63.	9956	462	69	24¾	21,500 B. *t*	Leghorn (Orlando)	1910	1911	1,100,000	8–3½ K.S.	1¾	7	7	8–6½	7	4 *9·2-in.*, 8 *7·5-in.*, 16 *3-in.*, 4 *3-pr.*, 2 *3-in.* A.A., 2 M.	3 (sub.) *18-in.*	24·0 *t.*	1500 —	..
b. / *b.*	**Kilkis** † (*ex* Mississippi) / **Lemnos** ‡ (*ex* Idaho) *See p.* P63.	13,000	382	77	24¾	13,765 B.&W. *t*	Phila-delphia	1905	1908	616,360	9–4 K.S.	3½–1 K.S.	7 K.S.	7 K.S.	10–7½ K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 8 *7-in.*, 8 *3-in.*, 2 *3-in.* A.A., 4 *6-pr.*, 4 *1-pr.*, 8 M., 2 L.	2 (sub.)	17·1 *t.*	1820 —	800
b.c.	**Salamis** (*ex* Vasilefs Giorgios)	19,500	570⅔	82	25¼	40,000	Hamburg	1914	§ Bldg.	..	..	..	..	..	..	..	8 *14-in.*, 12 *6-in.*, 12 *12-pr.*	2 (sub.)	24	..	..

* Retubed and refitted 1927. † Retubed and refitted 1926. ‡ Retubed and refitted 1928. § Abandoned, design modified, now being completed.

The old coast defence vessel Spetsai, 4,800 tons, is used in the training service.

GREECE.—Cruising Ships.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Helle ‖ (*ex* Fei-Hung)	2600	322	39	14	6000 tur.	Camden, N.J. .	1912	1914	240,000	¾	..	3 *4-in.*, 1 *3-in.* A.A., 110 mines	2 *18-in.*	20	600 / 100	230

‖ Repaired in France and fitted as a minelayer in 1929.

Old gunboat, Amvrakia, 470 tons. Training ship, **Ares, 1870 tons, 10 knots,** four 3-in. guns, completed at Chantiers de la Mediterranée, la Seyne, 1929. Repair ship, **Hephestos, 4,921 tons gross, 11½ knots.**

ITALY.—Armoured Ships.

Class.	NAME. Date for Scrapping under Washington Treaty.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement
		tons.	ft. ins.	ft. ins.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b. 1st Cl. b. 1st Cl.	Andrea Doria 1937 Caio Duilio 1936 See p. P64.	21,555 22,341†	575 9	92 0	29	24,000 P. tur. Y.	Spezia Castellammare	1913 1913	1916 1915	..	10–4 K.S.	1¾	6 K.S.	..	9½ K.S.	6 K.S.	13 12-in., 16 6-in., 13 3-in., 6 3-in. A.A., 2 2-pr., 6 M., 4 L.	2 (sub.) 18-in.	22	1430 / 840	1074
b. 1st Cl.	Conte di Cavour 1936 See p. P65.	21,604 22,144†	575 9	92 0	29	24,000 Parsons B. & W.	Spezia	1911	1915	..	10–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5 K.S.	13 12-in., 18 4·7-in., 13 3-in., 6 3-in. A.A., 2 2-pr., 2 M., 4 L., 1 catapult	2 (sub.) 18-in.	22	1430 / 840	1074
b. 1st Cl.	Giulio Cesare 1935 See p. P65.	21,819 22,144†	575 9	92 0	28	24,000 P. B.&W. P Bl.	Genoa (Ansaldo)	1911	1914	..	10–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5	13 12-in., 18 4·7-in., 13 3-in., 6 3-in. A.A., 2 2-pr., 2 M., 4 L., 1 catapult	2 (sub.) 18-in.	21·5	1430 / 690	1074
a.c.	Pisa * See p. P66.	8758	460 11	68 11	24¾	20,000 B.	Leghorn (Orlando)	1907	1909	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	8–6 K.S.	6½	4 10-in., 8 7·5-in., 12 3-in., 6 3-in. A.A., 2 3-pr., 4 M., 2 L.	2 (sub.) 18-in.	23·4	1486 / 138	687
a.c. a.c.	San Giorgio San Marco. See p. P66.	9232 9350	462 2	69 0	24¾	18000 Bl. 20000 tur.	Castellammare	1908	1910	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	7 K.S.	4 10-in., 8 7·5-in., 10 3-in., 6 3-in. A.A., 2 3-pr., 6 M., 2 L.	2 (sub.) 18-in.	23·2 23 7	1476 / 115 1378 / 66	643

* Boys' training ship.

† Load displacement accepted at the Washington Conference 1921–2.

ITALY.—Cruising Ships.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Side. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft.					£	in.	in.			knots.	tons.	
cr.	Pola . . . See p. P68.	10,000	..	..	..	95,000	Orlando, Leghorn	..	Bldg.	..	..	..	8 *8-in.*, 16 *3·9-in.* A.A., 12 smaller		32	..	..
l. cr.	Montecuccoli Muzio Attendolo See p. P68.	5,500	..	..	..	95,000	Ansaldo, Genoa	..	Bldg.	..	..	..	8 *6-in.*, 6 *3·9-in.* A.A., 12 smaller	4	37	oil	..
"	Gorizia . . . See p. P68.	10,000	590 9	67 9	20·2	95,000	Orlando, Leghorn	1930	Bldg.	..	..	..	8 *8-in.*, 16 *3·9-in.* A.A., 12 smaller		32	oil	..
"	Bolzano . . . See p. P67.	10,000	644 P.P.	68 0	..	150,000	Ansaldo, Genoa	1931	Bldg.	..	..	..	8 *8-in.*, 16 *3·9-in.* A.A., 12 smaller	8	36	oil	..
"	Armando Diaz	5,089	559 0	51 0	14·5	95,000	Odero-Terni, Spezia	1930	Bldg.	..	..	..	8 ***6-in.***, 6 *3·9-in.* A.A., 8 M. 1 catapult, 2 seaplanes	4	37	oil	..
"	Luigi Cadorna See p. P70.						Stabilimento Tecnico Triestino, Trieste	1931									
l. cr.	Zara . .	10,000	600 0	67 6	20·2	95,000	Odero-Terni, Muggiano	1930	1931	..	4 / —	..	8 *8-in.*, 16 *3·9-in.* A.A., 12 smaller (Zara 8), 3 aircraft		32	2200	..
"	Fiume . . See p. P68.						Stabilimento Tecnico Triestino, Trieste										
l. cr.	Alberto da Giussano . .					100,000 t.	Ansaldo, Sestri-Ponente	1930	1930	..	..	..	.. ..	..	39 t	..	..
	Alberico di Barbiano . .	4896	559 0	51 0	14·5	95,000			1931	..	..	..	8 *6-in.*, 6 *3·9-in.* A.A., 8 M., 1 catapult, 2 seaplanes.	4	37	..	..
	Bartolomeo Colleoni . .						Castellamare . ..		Bldg.								
	Giov. della Bande Nere . . See p. P70.								Bldg.								

cr.	**Trieste** .	10,000	640	9	67	7	18¾	150,000	Orlando, Leghorn, Trieste	1926	1929	..	..	..	8 *8-in.*, 16 *3·9-in.* A.A., 6 smaller, 1 catapult, 3 seaplanes.	4 (twin) A.W.	35	— / 1380	800
cr.	**Trento** . *See p.* P69.									1927									
l. c.	**Ancona** . (*ex* German Graudenz) *See p.* P73.	3838	456	0	45	0	17	26,000	Kiel	1913	1915	..	4–2½ / 1	..	7 *5·9-in.*, 3 *3-in.* A.A., 3 M., 120 mines	4 (2sub.)	27·25	1279 / 400	364
„	**Bari** (*ex*-German Pillau) *See p.* P71.	3248	440	11	46	0	19	27,400 turb.	Danzig (Schichau)	1914	1915	..	— / 1½–¾	1	8 *5·9-in.*, 3 *3-in.* A.A., 3 M., 120 mines	2	27·5	984 / 250	372
„	**Brindisi** (*ex*-Austrian Helgoland) *See p.* P72.	2756	430	0	42	0	15	25,000 Tur.	Fiume	1912	1914	..	2½ / ¾	..	9 *3·9-in.*, 1 *3-in.* A.A., 3 M., 1 L., 170 mines	3	27·0	750 / —	320
l. c.	**Libia**	3700	367	0	47	6	16	12,500	Genoa (Ansaldo)	1912	1913	..	— / 1½	..	8 *4·7-in.*, 3 *3-in.* A.A., 3 M.	2	22·9	640 / —	300
A.C.	**Miraglia**	4881	397	0	49	3	17	12,000	Spezia	1923	1925	..	..	..	4 *3 in.* A.A., 1 M., 2 catapults, 16 planes	..	21	..	300
l. cr.	**Quarto** . *See p.* P72.	2903	431	9	42	2	13¼	25,000 P.tur.Bl.	Venice	1911	1913	..	— / 1½–¾	..	6 *4·7-in.*, 6 *3-in.*, 2 *2-pr.* A.A., 3 M., 126 mines	2	28	49 / 482	240
l. cr.	**Taranto** (*ex*-German Strassburg) *See p.* P71.	3184	446	2	43	7	15¾	25,000 P. tur.	Wilhelmshaven	1911	1912	416,340	4–2½ / —	2	7 *5·9-in.*, 2 *3-in.* A.A., 3 M., 120 mines	2 (sub.)	27	1200 / —	373
l. cr.	**Venezia** (*ex*-Austrian Saida) *See p.* P72.	2756	430	0	42	0	15	25,000 Tur.	Monfalcone	1912	1914	..	2½ / ¾	..	9 *3·9-in.*, 1 *3-in.* A.A., 3 M.	3	27·0	750 / —	320

Minelayers and minesweepers Fasana, Buccari, Durazzo, Pelagosa, completed 1926, 600 tons, 11 knots, 1 *3-in.* gun, 200 mines; Azio, Legnano, Lepanto, Dardanelli, Milazzo, Ostia, completed 1926, 700 tons, 15 knots, 200 mines. Marghera, Brondobo, 117 tons, 13 knots, 60 mines; Laurana, Rovigno, Albona, 130 tons, 11 knots. Minesweepers Ansonia, 470 tons, 11·3 knots; Cotrone, Viesti, 475 tons, 13·8 knots; 35 in No., 200 tons, 13 knots. Oil transports Marte, Dalmazia, Istria, Livenza, Urano, Prometeo, Cocito, Lete, Stige, Niobe, Cerere, Giove, Tarvisio, Quarnero. Oil transport with under-water protection, Brennero. Gunboats and river gunboats, Arimondi, Cirene, Gallipoli, G. Lante, Augusta, Otranto, P. Corsini, Rimini, S. Caboto, E. Carlotto. Escort gunboats, A. Bafile, T. Farinati, E. Giovannini, C. del Greco, A. Vitturi, 230 tons, 23 knots. Surveying vessel, Ammiraglio Magnaghi, 1800 tons, 14 knots. 104 armed motor boats (M.A.S.) built and 4 under construction.

Training ships Cristoforo Colombo built at Castellammare di Stabia, completed 1928, displacement 3,000 tons, 10 knots. Amerigo Vespucci, building at Castellammare di Stabia, 2,990 tons, 1600 H.P. (Diesel), 6 *3-in.* A.A.

Submarine Depôt Ships Volta and Pacinotti, 2,362 tons, 19 knots, 1 *4-in.*, 2 *3-in.* A.A., completed 1924.

JAPAN.—Armoured Ships.

Class.	NAME. Date for Scrapping under Washington Treaty.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Belt.	Armour: Deck.	Armour: Side above Belt.	Armour: Bulkhead.	Armour: Gun Position: Heavy Guns.	Armour: Gun Position: Secondary.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.†
		tons.	ft. ins.	ft. ins.	ft. ins.						in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Fuso . 1937 *See p.* P76.	29,330 •	673 0	94 0	28 6	40,000 tur.	Kure .	1914	1915	..	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 2 seaplanes	6 (sub.) *21-in.*	22·5	4000 / 1300	1272
b.	Hyuga . 1940 *See p.* P75.	29,990	683 0	94 0	28 6	45,000 tur.	Nagasaki (Mitsubishi)	1917	1918								12 *14-in.*, 20 *5·5-in.*, 4 *3-n.* A.A., 2 M. H A., 2 planes	6 (sub.) *21-in.*	23·0	4500 / 1300	1360
b.c.	Haruna * 1935	29,330	704 0	95 0	27 0	64,000 My. P. t.	Kobe . (Kawasaki)	1913	1915	..	8–3 K.S.	$2\frac{3}{4}$	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 2 planes	4 (sub.)	26·0	4000 / 1000	1250
”	Hiyei † * 1935 *See p.* P77.	29,330		92 0	27 6	My. C. t.	Yokosuka .	1912	1914									8 (sub.) *21-in.*	27·5		
b.	Ise . 1939 *See p.* P75.	29,990	683 0	94 0	28 8	45,000 P. tur.	Kobe . (Kawasaki)	1916	1917	..	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 20 *5·5-in.*, 4 *3-in.* A.A , 2 M. H.A., 2 seaplanes	6 (sub.) *21-in.*	23·0	4500 / 1300	1360
b.c.	Kirishima * . 1936 *See p.* P77.	29,330	704 0	92 6	27 0	64,000 My.P. t.	Nagasaki (Mitsubishi)	1913	1915	..	8–3 K.S.	$2\frac{3}{4}$	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *3-in.*, A.A., 4 M., 4 L.	8 (sub.) *21-in.*	27·5	4000 / 1000	1250

b. c.	**Kongo** * . 1934 *See p.* P77	29,330	704	0·92	0·27	6	64,000 Y. P. t.	Barrow .	1912	1913	2,500,000	8–3 K.S.	2¾	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 2 planes	8 (sub.) 21-in.	27·5	4000 / 1000	1309 (as flag-ship)
b.	**Mutsu** . 1942	32,720	700	0·95	0·30	0	46,000 G	Yokosuka .	1920	1921	..	12 K.S.	3½	..	..	..	..	8 *16-in.*, 20 *5·5-in.*, 4 *3-in.* A.A. (7 *3-in.* A.A. Nagato), 1 seaplane	8 (4 sub., 4 a.w.) 21-in.	23·0	1600 / 3400	1304
b.	**Nagato** . 1941 *See p.* P74.							Kure .	1919	1920												1367 (as fleet flag-ship)
b.	**Yamashiro** 1938 *See p.* P76.	29,330	673	0·94	0·28	6	40,000 tur.	Yokosuka .	1915	1917	..	12 K.S.	3	8 K.S.	..	12 K.S	6 K.S.	12 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 2 seaplanes	6 (sub.) 21-in.	22·5	4000 / 1300	1272

Armoured Cruisers now rated as Coast-defence Ships, completed 1899–1904: Nisshin, 7080 tons, 20 knots, 4 8-in., 14 6-in.; Kasuga, 7080 tons, 20 knots, 1 10-in., 2 8-in.; Yakumo, 9010 tons, 20 knots, 4 8-in., 12 6-in.; Adzuma, 8640 tons, 20 knots, 4 8-in., 12 6-in.; Idzumo and Iwate, 9180 tons, 20¾ knots, 4 8-in., 8 6-in.; Asama, 9240 tons, 21½ knots, 4 8-in., 8 6-in.; Tsushima, 3120 tons, 20 knots, 6 6-in.

* Modernised 1928–1931, including fitting of bulges and new foremast.

† To be disposed of in accordance with London Naval Treaty, or may be retained for training purposes only.

JAPAN.—Cruising Ships, &c.

Class	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Side. / Deck.	Armour: Gun Position.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	A new cruiser	8,500	..	..	..	..	Kure	..	..	..	..	..	..	..	..	..	..
A.C.	Ryujo	7,600	..	..	..	40,000	Yokohama	1931	Bldg.	..	..	..	12 5·1-in., 24 aircraft	..	25	..	600
cr.	Chokai	10,000	630 p.p.	62½	16½	100,000	Nagasaki	1931	Bldg.	..	..	..	10 8-in., 4 4·7-in. A.A.	8	33	..	..
cr.	Maya *See p.* P80.						Kobe	1930									
A.C.	Akagi * *See p.* P79.	26,900	763 p.p.	92 3	22 2	131,200 (G.)	Kure	1925	1927	..	..	..	10 8-in., 12 4·7-in. A.A., 66 planes	6	28·5	2100/3000	..
cr.	Atago	10,000	630 p.p.	62½	16½	100,000	Kure	1930	Bldg.	..	..	..	10 8-in., 4 4·7-in. A A.	8	33	..	..
,,	Takao *See p.* P80.						Yokosuka										
S.C.	Notoro	14,050	445 p.p.	58	26½	3,750	Kawasaki	1920	1920	..	..	..	2 5·5-in., 2 3-in. A.A., 15 sea-planes	..	12	..	..
cr.	Ashigara	10,000	630 p.p.	62½	17¼	100,000	Kobe	1928	1929	..	3/—	..	10 8-in., 6 4·7-in. A.A., 1 catapult	..	33	—/3000	692
,,	Haguro						Nagasaki		1929								
,,	Myoko						Yokosuka	1927	1929					12			
,,	Nachi *See p.* P80.						Kure		1928								
l.cr.	Kinugasa	7100	595	51	15¼	95,000	Kawasaki, Kobe	1926	1927	..	..	..	6 8-in., 4 4·7-in. A.A., 2 planes, 1 catapult	12	33	400/1400	604
,,	Aoba *See p.* P81.						Nagasaki	1926	1927								
,,	Furutaka						,,	1925	1926	..	..	..	6 8-in., 4 3-in. A.A., 2 planes, 1 catapult				
,,	Kako *See p.* P82.						Kawasaki, Kobe	1925	1926								
,,	Hirado	4400	475	46½	16¾	22,500 P. tur. My.	Kobe	1911	1912	..	2¼	..	8 6-in., 2 3-in., 2 3-in. A.A., 2 M.	3 18-in.	26	900/300	410
,,	Yahagi						Nagasaki										
A.C.	Hosho † *See p.* P 78.	7470	510 p.p.	48 2	20¼	30,000 (G.)	Tsurumi (Asano)	1921	1922	..	..	..	4 5·5-in., 2 3-in. A.A., 28 planes	..	25	—/2700	550
l.cr.	Abukuma	5170	535	46¾	15¾	90,000 (G.)	Uraga	1923	1925	..	2/—	..	7 5·5-in., 2 3-in. A.A., 2 M., 1 Pom-pom A.A., 1 sea-plane	8 21-in.	33·0	300/1260	450
,,	Isudzu						Uraga	1921	1923								
,,	Nagara						Sasebo	1922	1922								
,,	Natori *See p.* P85.						Nagasaki (Mitsubishi)	1922	1922								

l. cr.	Yura	5170	535	47¼	15¾	90,000 (G.)	Sasebo	1922	1923	..	2/—	..	7 5·5-*in.* 2 3-*in.* A.A., 2 M., 1 Pom-pom A.A., 1 sea-plane	8 21-in.	33·0	300/1260	450
„	Kinu *See p.* P85.						Kawasaki	1922	1922								
A.C.	Kaga ‡	26,900	715 p.p.	102	22 1	91,000	Kobe (Kawasaki)	1921	1928	..	..	..	10 8-*in.*, 12 4·7-*in.* A.A., 60 aircraft	..	23	—/5300	..
l. cr.	Jintsu.	5195	535	46¾	15¾	90,000	Kawasaki	1923	1925	..	2/—	..	7 5·5-*in.*, 2 3-*in.* A.A., 2 M., 1 Pom-pom A.A., 1 sea-plane	8 21-in.	33·0	300/1260	450
„	Naka						Yokohama	1925	1925								
„	Sendai *See p.* P83.						Nagasaki	1923	1924								
„	Kiso	5100	535	47¼	15¾	90,000 (G.)	Nagasaki	1920	1921	..	2/—	..	7 5·5-*in.*, 2 3-*in.* A.A., 2 M., 1 Pom-pom A.A., 80 mines	8 21-in.	33·0	300/1260	439
„	Kitakami						Sasebo	1920	1921								
„	Kuma						Sasebo	1919	1920								
„	O-I						Kobe	1920	1921								
„	Tama *See p.* P85.						Nagasaki (Mitsubishi)	1920	1921								
„	Tatsuta	3230	468	40¾	13	51,000 (G.)	Sasebo	1918	1919	..	..	..	4 5·5-*in.*, 1 3-*in.* A.A., 2 M.	6	31	—/900	332
„	Tenryu *See p.* P85.						Yokosuka										
„	Yubari *See p.* P84.	2890	465	39½	11¾	57,000	Sasebo	1923	1923	..	..	..	6 5·5-*in.*, 1 3-*in.* A.A., 2 M., 34 mines	4	33	—/820	328

* Re-designed from battle cruiser. † Fitted with gyro-stabiliser. ‡ Re-designed from battleship.

MINELAYERS.—Katsuriki, 1917, 1540 tons, 13 knots, 3 4·7-in., 150 mines; Itsukushima, launched at Uraga, 1929, 1970 tons, 17 knots, 3 5·5-in., 2 3-in. A.A., and one building, Yayeyama, similar to Itsukushima; Tokiwa, 9240 tons, 21 knots, 2 8-in., 8 6-in., and 17 smaller vessels.

MINESWEEPERS.—Nos. 1, 2, 3 (1923), No. 4 (1925), and Nos. 5, 6 (1929), 700 tons, 20 knots, 2 4·7-in., 1 3-in. A.A.

GUNBOATS.—Saga (1912), 785 tons, 15 knots, 1 4·7-in., 3 3-in.; Uji (1903), 620 tons, 13 knots, 4 3-in.; Ataka (1922), 820 tons, 16 knots, 2 4·7-in., 2 3-in. A.A.; Yodo, 1320 tons, 22 knots, 2 4·7-in., 4 3-in.

RIVER GUNBOATS.—Futami, 170 tons, 16 knots, 1 3-in. gun, built at Fujinagata, Osaka, completed 1930; Atami (1929), 170 tons, 16 knots. Katata, Hira, Hodzu, Seta (1923), 305 tons, 16 knots, 2 3-in. A.A.; Toba (1911), 250 tons, 15 knots, 2 3 in.; Fushimi (1906), 180 tons, 14 knots, 2 6-pr.; Sumida (1906), 126 tons, 13 knots, 2 6-pr.; and Kotaka (1930), 50 tons, 15 knots, 5 M.G.

SUBMARINE DEPÔT SHIPS.—Chogei (1924), Jingei (1923), 5160 tons; Komahashi (1914), 1230 tons.

ANTI-SUBMARINE SHIPS.—Shirataka (1929), 1324 tons, 16 knots speed, three 4·7-in. A.A. guns. Tsubane and Kamone (1929), 450 tons, 19 knots, 1 3-in.

3 vessels of "Kuma" class to be retained for training purposes only, in accordance with London Naval Treaty.

NETHERLANDS.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
cr.	A new cruiser * . .	5250	..	..	..	70,000	..	..	Bldg.	..	..	..	..	..	..	..	6 *5·9-in.*, 4 *4·2-in.*, and smaller.	..	32	..	..
a.g.b.	Brinio . . .	540	172¼	28	9¼	1200	Amsterdam .	1912	1914	..	2 K.S.	¾	..	..	..	..	4 *4·1-in.*, 2 M.	..	14	34 Oil	52
,,	Friso . . .							1912	1914												
,,	Gruno . . .							1913	1915												
c.d.s.	Hertog Hendrik . See p. P86.	5000	317	50	19	6282 t.	Amsterdam	1902	1903	347,500	6 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 6 *5·9-in.*, 4 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	3 2 sub.	16·5 t	710 / —	347
,,	Jacob van Heemskerck †	4921	321½	50	19	6396 t.	Amsterdam .	1906	1908	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	6 H.N.S.	2 *9·4-in.*, 6 *5·9-in.*, 6 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	2 (sub.)	16·5 t	520 / —	351
l. cr.	Java . . .	6930	509½	52½	18	65,000	Flushing .	1921	1925	..	3	..	1	..	4	..	10 *5·9-in.*, 4 *3-in.* A.A., 8 M., 40 mines, 2 seaplanes.	—	30	— / 1070	490
,,	Sumatra . . . See p. P87.						Amsterdam	1920	1926												
c.d.s.	Marten Tromp † . See p. P86.	5216	330	50	18¾	6405 t	Amsterdam .	1904	1906	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 8 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	2 (sub.)	16·7 t	710 / —	349
c.d.s.	De Zeven Provincien †	6426	333	56	20¼	8516 Y. t	Amsterdam .	1909	1910	..	6–4 K.S.	2	..	..	10 K.S.	4 K.S.	2 *11-in.*, 4 *5·9-in.*, 10 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	..	16·3 t	885 / —	409

The Java and Sumatra are assigned to the Indian Military Marine. Light cruiser Gelderland (1900), 3966 tons, now used as gunnery training ship. Four old gunboats: Hefring, 265 tons, Braga, Tyr and Freyr, 275 tons. Gunboats in the Indian Military Marine: Soemba, Flores, completed 1926 and 1927 respectively, of 1676 tons, 15 knots, three 5·9 in., 1 3-in. A.A., 2 M. Minelayers: Nautilus (1930), used for fishery protection, 955 tons, 14 knots, two 3-in., two 1-pr., 2 M.; Douwe Aukes, Van Meerlant (1922), 749 tons, 13·5 knots, three 3-in. A.A., 2 M., 30 mines; Medusa and Hydra (1911), 670 tons, 11·5 knots, three 3-in., one 1-pr., 1 M., 65 mines; a new vessel authorised and eight old vessels. Minelayers attached to Indian Military Marine: Krakatau (1924), 1120 tons, 17 knots, two 3-in. A.A., 2 M., 150 mines; Pro Patria (1923), 605 tons, 11 knots, one 3-in. A.A., 2 M., 80 mines, two building (Priens Von Orange and Goudon Leeuw), and four old vessels. Minesweepers: I.–IV., 270–295 tons; (for the Indian Military Marine): A, B, C, D (1930), 187 tons; 12 knots; and one 1600 tons building. Surveying vessels: Eilerts de Haan, Hydrograaf, and Willebrord Snellius; and in the Indian Military Marine, Van Doorn, Van Gogh, Tydeman. Submarine depôt ships: Cornelius Drebbel, 787 tons, 6 knots; and (in Indian Military Marine) Pelikaan (1922), 2600 tons, 12 knots, four 2·75 in., 4 M.

One gunboat is authorised. 4 C.M.B.'s. * For Indian Military Marine. † Of little fighting value.

NORWAY.—Armoured Ships.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Belt.	Armour: Deck.	Armour: Side above Belt.	Armour: Bulkhead.	Armour: Gun Position: Heavy Guns.	Armour: Gun Position: Secondary.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Fuel: Coal. / Oil.	Complement.
		tons	ft.	ft.	ft.					£	in.	in.			in.	in.			knots.	tons.	
c.d.s.	Eidsvold, Norge (*See p.* P86.)	4166	310½	50½	16½	5100 Y. *t*	Elswick	1900	1901	350,000	6 H.N.S.	2	..	..	6 H.N.S.	6 H.N.S.	2 *8·2-in.* 6 *5·9-in.*, 8 *3-in.*, 6 *3-pr.*	2 (sub.) 18-in	16·9 *t*	550 / —	270
„	Harald Haarfagre	3860	304	48½	16½	4720 *t*	Elswick	1896	1898	300,000	7 H.S.	2	..	..	8 H.S.	..	2 *8·2-in.*, 6 *4·7-in.*, 6 *3-in.*, 6 M.	3 2 sub.	17·2 *t*	550 / —	249
„	Tordenskjold*							1897	1899												

* Employed as training ship for Cadets.

Cruising Ship.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Deck.	Armour: Gun Position.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.b. 2nd Cl.	Ægir	413	108½	29½	8	350	Horten	1892	1893	..	1½	..	1 *8·2-in.*, 1 *10-pr.*, 2 *4-pr.*	—	9·8	22	43

Fishery Protection vessels Fridtjof Nansen (1931), 1500 tons, 15 knots, 2000 H.P., and Heimdal (1892), 660 tons, 12 knots. Minelayers Fröya (1918), 760 tons, 22 knots, 100 mines; Glommen and Laugen (1918), 335 tons, 9½ knots, 50 mines; seven old gunboats refitted as minelayers, 230-280 tons. One minelayer (and training ship) is authorised, 1600 tons, 20 knots, 7000 H.P., 4 4·7-in. and 1 A.A. guns, and 2 T.T.S. 280 mines. Submarine depôt ship Savpen, 187 tons. Four sloops and six mine-layers are projected, but no money has yet been voted for these.

SOVIET UNION.—Armoured Ships.

Class	NAME.	Normal Displacement.	Length. (Extreme).	Beam.	Draught.	Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.							in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Paris Commune (ex-Sevastopol)																					
b.	October Revolution (ex-Gangut)	23,000	594	87	27½	42,000	Baltic Works	Baltic Works	1911	1915	..	9–5	3	..	..	12–10	6	12 *12-in.*, 16 *4·7 in.*, 2 *9-pr.* A.A., 1 *3-pr.*	4 (sub.)	23	2000 / 1000	1130
b.	Marat																					
b.	Michael Frunze (ex-Poltava)																					
b.	General Alexieff*	22,600	551¼	89¾	27	26,500	Nikolaev R.S.B.Co.	..	1914	1917	..	12–4	3–1½	9–8	..	12–8	5	12 *12-in.*, 18 *5-in.*, 4 *2·5-in.* A.A., 4 *3-pr.*, 8 *11-pr.*, 4 M.	4 (sub.)	21	2300 / 729	1252

* Under French protection.

Cruising Ships.

Class.	NAME.	Normal Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal / Oil	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
l. cr.	Aurora (ex-S.S.S.R)	6730	416	55	21	11,600	Petrograd	1900	1903	..	..	..	14 *6-in.*, 5 *6-pr.* A.A., 2 M.	..	20	964 / —	573
„	Almaz *	3300	363	43½	17½	7,500	..	1903	1904	..	— / 3	..	7 *4·7-in.*, 2 M.	..	19	650 / —	300
„	Chevonaya-Ukrainia (ex-Ad. Nakhimov)	7600	535½	51½	18½	55,000	Nikolaev	1915	1923	..	..	..	15 *5·1-in.*, 4 *3-in.* A.A., 4 M., 100 mines, 2 seaplanes	2 (sub.)	29½	540 / 690	600
„	Komintern (ex-Pamyat Merkuriya)	6675	440	54½	20½	19,500	Nikolaev	1903	1907	..	..	..	15 *5·1-in.*, 4 *3-in.*, 4 *6-pr.*	2 (sub.)	23	1190 / —	595
„	General Kornilov *	6675	439½	54½	20½	19,500	Sevastopol	1902	1905	..	..	..	16 *6-in.*, 2 *11-pr.*	2 (sub.)	23	1100 / —	595
„	Krasni Kavkaz (ex-Ad. Lazarev)	about 7000	535⅓	51½	18½	60,000	Nikolaev	1916	1930	..	3 / 1	3	15 *5·1-in.*, 4 *3-in.* A.A., 4 M., 100 mines	2 (sub.)	29½	540 / 690	650
„	Profintern (ex-Svietlana)	6800	507¾	50⅓	18⅓	50,000	Reval	1915	1925	..	3 / 1	3	15 *5·1-in.*, 4 *4-in.* A.A., 4 *3-in.*, 4 M.	2 (sub.)	29½	1167 / —	..
„	Voroshilov (ex-Ad. Grieg)	6800	..	..	..	50,000	..	..	1930	..	..	..	15 *5·1-in.*, 4 *4-in.* A.A., 4 *3-in.*, 4 M.	..	25	..	..

* Under French protection.

4 sloops, 2 gunboats, 6 river gunboats, 20 minesweepers, about 25 C.M.B.s, and miscellaneous other craft.

SPAIN.—Armoured Ships.

Class	NAME.	Normal Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
..D.	**Espana** (*ex-* Alfonso XIII.) *See p.* P88.	15,452	459¼	78¾	25½	15,500Y. P. tur.	Ferrol	1913	1916	..	9–4 K.S.	2–1	6–5 K.S.	6–3 K.S.	10 K.S.	3 K.	8 *12-in.*, 20 *4-in.*, 2 *3-pr.*, 2 L., 2 M.	—	19·5	1850 / 20	854
..c.	**Cataluña**	7405	383¾	61	23¼	10,580 *t*	Cartagena	1900	1908	600,000	12–10	2	..	12	10½	..	2 *9·4-in.*, 8 *5·5-in.*, 2 *3-in.*, 8 *6-pr.*	—	18·8 *t*	1178 / —	442
..D.	**Jaime I.** *See p.* P88.	15,452	459¼	78¾	25½	15,500Y. P. tur.	Ferrol	1914	1922	..	9–4 K.S.	2–1	6–5 K.S.	6–3 K.S.	10 K.S.	3 K.	8 *12-in.*, 20 *4-in.*, 4 *3-pr.*, 4 *3-pr.* A.A., 2 M.	—	20·2 *t*	1850 / 20	854

SPAIN.—Cruising Ships.

Class.	NAME.	Normal Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Side. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	ins.				knots.	tons.	
l. cr.	Canarias	10,000 (standard)	636	64	17·4	90,000	Ferrol	1931	Bdg.	..	4* / 3	1	8 *8-in.*, 6 *4·7-in.*, 4 *4·7-in.* A.A., 8 *2 pr.* A.A., 2 seaplanes; 1 catapult.	12 21-in.	33·0	— / 2750	700
,,	Baleares							—									
,,	Miguel de Cervantes	7850	579½	54	16½	80,000	Ferrol	1928	1930	..	3 / —	..	8 *6-in.*, 4 *4-in.* A.A., 2 *3-pr.*, 1 M.	12 21-in.	33·0	— / 1680	560
,,	Almirante Cervera *See p.* P89.							1925	1928								
,,	Libertad *ex*-Principe Alfonso) *See p.* P89.							1925	1927								
g.b.	Bonifaz	787	213¾	30	9½	1100 Y	Cartagena	1911	1912	..	..	..	4 *3-in.*, 2 M.	—	14·0	148 / —	121
,,	Eduardo Dato	1335	253½	33½	11¼	1700	Ferrol	1923	1925	..	..	..	4 *4-in.*, 2 M.	..	15	324 / —	131
,,	Jose Canalejas							1922	1924								
,,	Antonio Canovas del Castillo							1922	1923								
l. cr.	Extremadura	2100	288	36	16¼	7000 T	Cadiz	1900	1902	..	— / 2	..	8 *4-in.* (Vickers), 4 *6-pr.*, 4 *1-pr.*	..	19·0	425 / —	266
g.b.	Lauria	787	213¾	30	9½	1100 Y	Cartagena	1912	1912	..	..	..	4 *3-in.*, 2 M.	—	14·0	148 / —	121
,,	Laya							1911	1911								
,,	Recalde	787	213	30	9½	1100 Y	Cartagena	1911	1911	..	..	..	4 *3-in.*, 2 M.	—	13·8*t*	148 / —	121
l. cr.	Republica (*ex*-Reina Victoria Eugenia) *See p.* P90.	6130	462	50	15¾	25,500 P.T.	Ferrol	1920	1922	..	3–1½ / —	3	9 *6-in.*, 4 *3-pr.* A.A., 1 *3-in.*, 4 M., 1 L.	4 21-in.	25·5	1200 / 230	404
,,	Blas de Lezo	4650	462	46	14½	45,000	Ferrol	1923	1925	..	..	..	6 *6-in.*, 4 *3-pr.* A.A., 4 M.	12 21-in.	29·0	800 / 500	320
,,	Mendez Nuñez *See p.* P90.							1922	1924						29·5*t*		

Seaplane-carrier Dédalo 10,800 tons, 13 knots, converted 1922, can carry 2 small dirigibles, 2 balloons, and 25 planes, two 4·1-in., four 3-in. A.A.

Motor-launches, M 1, 2, 4, 5, 6; H 2, 3, 4, 40 tons. Training ships: Sebastian Elcano (1928), 3500 tons, 9·5 knots; Galatea (*ex*-Clarastella), 2500 tons, bought in Italy. Carlos V. (*ex*-armoured cruiser, 1895), 10,000 tons; and Rio de la Plata (*ex*-cruiser) 1920 tons. Eleven armed trawlers and several auxiliaries.

Submarine salvage vessel Kanguro (1917), 3000 tons, 10 knots, four 2-pr. 3rd class gunboat Macmahon (114 tons). Surveying ship Goralda (2400 tons).

Three coastguard patrol vessels, 250 tons, authorised.

* And to magazines.

SWEDEN.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.b.	**Aran**	3592	287	49¼	16·7	6500 Y.	Gothenburg	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub. 18-in.	17·2 *t*	300 / —	287
,,	**Drottning-Victoria** See p. P91.	7500	396·7	61	21½	22,000 tur. Y.	Gothenburg	1917	1921	666,000	8–6 K.S.	1½	4 H.S.	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *5·9-in.*, 6 *3-in.*, 2 *6-pr.*, 2 M.	..	23·0	690 / 98	450
a.c.	**Fylgia**	4902	377·6	48·5	20·6	12,440 Y. *t*	Stockholm	1905	1907	385,700	4 K.S.	2	..	..	5 K.S.	5 K.S.	8 *5·9-in.*, 10 *6-pr.*, 2 *1-pr.*	2 sub.	22·5 *t*	900 / —	328
A.C.	**Gotland** See p. P92.	4750	442	48½	14·7	33,000	Gothenburg	..	Bldg.	900,000 (estimated)	..	..	..	..	..	..	6 *6-in.*, 4 *3-in.* A.A., 4 M., 100 mines, 8 seaplanes, 2 catapults	6 21-in.	27·0	—	453
c.d.b.	**Gustav V.** See p. P93.	7500	396·7	61	21½	22,000 tur. Y.	Malmö	1918	1921	666,000	8–6 K.S.	1½	4 H.S.	..	8 K.S.	5 K.S.	4 *11-in.* 8 *5·9-in.*, 6 *3-in.*, 2 *6-pr.*, 2 M.	..	23·0	690 / 98	450
,,	**Manligheten**	3780	287	49¼	17·4	7400 Y.	Malmö	1903	1904	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 8 *6-pr.*, 1 *1-pr.*	2 sub. 21-in.	17·0	300 / —	287
,,	**Oscar II** See p. P91.	4584	313·6	50·5	18	9000 Y.	Gothenburg	1905	1907	..	6 K.S.	2	6 K.S.	6 K.S.	7½ K.S.	5 K.S.	2 *8·2-in.*, 8 *5·9-in.*, 8 *6-pr.*, 1 *1-pr.*	2 sub. 18-in.	18·0	500 / —	330
,,	**Sverige** See p. P93.	6990	392·7	61	21½	20,000 tur. Y.	Gothenburg	1915	1917	666,000	8–6 K.S.	1½	4 K.S.	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *5·9-in.*, 6 *3-in.*, 2 *6-pr.*, 2 M.	—	22·5	690 / 98	450
,,	**Tapperheten**	3780	287	49¼	17·7	6000 Y.	Malmö	1901	1903	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub. 21-in.	16·5	300 / —	287
,,	**Wasa**	3686	287	49¼	17	6000 Y.	Stockholm	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub. 21-in.	16·5	300 / —	287

Gustav V. and Sverige have been reconstructed and modernised. Drottning-Victoria is also to be reconstructed. Two older coast-defence ships, Oden, Thor (1897, 1899) (reconstructed 1915–16), 3715 tons, 15 knots, 5500 H.P., 2 9·8-in., 6 4·7-in., 8 6-pr. guns. Minelayer Clas Fleming, 1800 tons, 4 4·7-in., 20 knots, 100 mines; Vedette boats (employed as minesweepers) Sökaren, Sveparen, Sprängeren, and others. Torpedo gunboats Jacob Bagge, Oernen, Psilander, 830 tons, 2 4·7-in., 4 2·2-in., 20 knots. Two gunboats, 388, 589 tons. Depôt ship for submarines, Svea, 3300 tons. Aircraft depôt ship Dristigheten (1901), 3620 tons. Four sailing training ships.

UNITED STATES.—Armoured Ships.

Class.	NAME. Date for Scrapping under Washington Treaty.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. §	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Arizona** † . 1937. *See p.* P98.	‡ 31,400 32,100	608	97	28¾	34,000 B. & W. P. tur. (G.)	New York . (Navy Yard)	1915	1916	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (45 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 2 L., 1 catapult, 3 aeroplanes	—	21·0	— / 2300	1400
b.	**Arkansas** * . 1935. *See p.* P100.	‡ 27,900 26,100	562	93¼	28½	28,533 P. tur. *t*	Camden, N.J. (N.Y.S.B.Co.)	1911	1912	964,000	11–5 K.S.	3	..	8–6 K.S.	11 K.S	6½	12 *12-in.*, 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	—	21·0	— / 5100	1430
b.	**California** . 1941. *See p.* P95.	‡ 32,300 32,600	624	97½	30¼	28,500 Tur. (G.) electric drive	Mare Island (Navy Yard)	1919	1921	..	14 K.S.	..	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *6-pr.*, 2 M., 2 *1-pr.*, 2 catapult, 3 aeroplanes	2 (sub.) 21-in.	21·5	— / 4656	1407
b.	**Colorado** . 1942. *See p.* P94.	‡ 32,600 32,500	624	97½	30½	28,900 B. & W. tur. electric drive	N.Y.S.B Co.	1921	1923	1,383,000	13½–12 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	2 (sub.)	21·0	— / 4570	1407

b.	**Idaho** * . . 1939 *See p.* P96	32,000‡ 30,800‖	624	97½	30	32,000 B. & W. P. tur. (G.)	Camden, N.J. (N.Y.S.B. Co.)	1917	1919	1,485,000	6–3½ K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 2 L., 1 catapult, 3 aeroplanes.	2 (sub.)	21	— / 3271	1374
A.C.	**Lexington** . *See p.* P104.	33,000	880	106	30	180,000 tur.electric	Quincy, Mass.	..	1927	9,000,000	..	..	..	..	..	..	8 *8-in.*, 12 *5-in.* A.A. 4 *6-pr.* Stowage for 72 aircraft. Fitted with a catapult.	..	33½	Oil	..
b.	**Maryland** . 1941 *See p.* P94.	32,600‡ 31,500	624	97½	30½	28,900 T. electric drive	Newport News	1920	1921	1,383,000	13½–12 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in*, 8 *5-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes.	2 (sub.)	21	— / 4570	1407
b	**Mississippi** * . 1938 *See p.* P96.	32,000‡ 30,100‖	624	97½	30	32,000 B. & W. Cur. t. (G.)	Newport News	917	1917	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes.	2 (sub.) 21-in.	21	— / 3271	1374

* See note *, p. 275. † Being modernised. See note †, p. 275. ‡ Displacement accepted at Washington Conference. ‖ Will be increased by about 3000 tons after modernisation.
§ The sums given in this column are exclusive of the cost of armour and armament according to the system of making appropriations in the estimates.

UNITED STATES.—Armoured Ships—*continued*.

Class.	NAME. DATE FOR SCRAPPING UNDER WASHINGTON TREATY.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Nevada** § . 1936 *See p.* P97.	27,500 ǁ 29,000	583	95¼	28½	23,312 Y. Cur. tur.	Quincy, Mass. (Fore River)	1914	1916	1,211,342	13½–8 K.S	1½–3	.. K.S.	13½ K.S.	18–16 K.S.	..	10 *14-in.* (45 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 L., 2 catapults, 3 aeroplanes	..	20·5	— / 2000	1320
b.	**New Mexico** ‡ 1939 *See p.* P96.	32,000 ǁ 30,000	624	97½	30	27,500 B. & W. Electric drive	New York . (Navy Yard)	1917	1918	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*, 2 *1 pr.*, 2 M., 1 catapult, 3 aeroplanes	2 (sub.) 21-in.	21·0	— / 3271	1414
b.	**New York** * . 1935 *See p.* P99.	28,700 ǁ 27,000	573	95¼	28½	29,687 B. & W.	New York . (Navy Yard)	1912	1914	1,315,114	12–4 K S	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.* (45 cal.), 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	..	21·5	— / 5200	1450
b.	**Oklahoma** § . 1936 *See p.* P97.	27,500 ǁ 29,000	583	95¼	29¾	21,703 B. & W.	New York .	1914	1916	2,200,000	13½–8 K.S.	1½–3	K.S.	13½ K.S.	18–16 K S.	..	10 *14-in.* (45 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	..	20·6	— / 2000	1320
b.	**Pennsylvania** † 1937 *See p.* P98.	31,400 ǁ 32,100	608	97	29¾	31,500 B. & W. Cur. tur.	Newport News	1915	1916	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (45 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes.	..	21·0	— / 2300	1380
a.c.	**Pittsburg** .	13,680	504	69½	24½	28,600 Nic.	Philadelphia (Cramp)	1903	1905	799,340	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.*	2 (sub.)	22·4 *t*	2100 / —	898
a.c.	**Rochester** .	8,150	384	65	23¼	16,600	Philadelphia (Cramp)	1891	1893	..	4	2¼	..	..	6–6½	..	4 *8-in.*, 8 *5-in.*, 2 *3-in.* A.A., 2 *3-pr.*	..	21·0	1100 / —	662

A.C.	**Saratoga** . *See p.* P.104.	33,000	888	106	30	180,000 tur.electric	N.Y. Ship-building Co.	1925	1927	9,000,000	..	..	..	..	..	..	8 *8-in.*, 12 *5-in.* A.A., 4 6-*pr.*, stowage for 80 aircraft. Fitted with a catapult	..	33¼	..	..
b.	**Tennessee** . 1940 *See p.* P95.	32,300 ‖ 32,800	624	97¼	30½	28,500 T. electric drive.	New York Navy yard	1919	1920	..	14 K.S.	..	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M.. 2 catapults, 3 aeroplanes	2 (sub.)	21·0	— / 4656	1407
b.	**Texas** * . 1935 *See p.* P99.	28,700 ‖ 27,000	573	95¼	28½	28,100 B. & W.	Newport News	1912	1914	1,166,000	12–4 K.S.	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.* (45 cal.), 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	—	21·0	— / 5200	1450
b.	**West Virginia** 1942 *See p.* P94.	32,600 ‖ 31,800	624	97½	30½	28,900 T. electric drive.	Newport News	1921	1923	1,383,000	13½–12 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.*, 8 *5-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	2 (sub.) 21-in.	21·0	— / 4570	1407

Battleship Utah was converted to a target ship in 1931 in accordance with the London Naval Treaty, and the battleship Wyoming was converted to a training ship in 1931 in accordance with London Naval Treaty.

* Modernised in 1927. Modernisation included fitting of bulge protection, protection of decks against aerial attack, conversion to oil burning, installation of 3-in. A.A. battery, addition of catapults, alteration to masts. Cost about £600,000 each ship. Displacement increased about 3000 tons.

† Modernised in 1931. Modernisation includes fitting additional protection, reboilering, increasing elevation of turret guns, replacing present anti-aircraft batteries by 5-inch A.A. guns, new masts and new fire control.

‡ To be modernised. Modernisation to include protection of decks against aerial attack, increasing elevation of turret guns, installation of eight 5-in. A.A. guns, addition of catapults, alteration to masts. Electric drive in New Mexico to be replaced by steam turbine propelling machinery.

§ Modernisation completed 1929.

‖ Displacement accepted at Washington Conference.

UNITED STATES.—Cruising Ships, &c.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. $	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
l. c.	No. 37. Tuscaloosa						New York, S. B. Co.										
,,	No. 38. San Francisco	10,000	..	..	..	107,000	Mare Island Navy Yard	..	Bldg.	2,090,000 estimated	..	..	9 8-*in.*, 8 5-*in.* A.A., and smaller, 4 aircraft	6	32½	..	..
,,	No. 32. New Orleans		588	61¾	..	..	N. Y. Navy Yard										
,,	No. 33. Portland		592	65	..	..	Bethlehem S. B. Co.										
,,	No. 34. Astoria	10,000	578	61	..	107,000	New York Puget Sound Navy Yard	..	Bldg.	..	..	..	9 8-*in.*, 8 5-*in.* A.A., 2 catapults, 4–6 aircraft	6 21-in.	32·5	..	602
,,	No. 35. Indianapolis		600	65	..	..	N. Y. Shipbuilding Co., Camden										
,,	No. 36. Minneapolis		..	..	..	..	Philadelphia Navy Yard										
,,	No. 26. Northampton	..	..	..	..	..	Bethlehem, S. B. Corp., Fore River	1929	1930								
,,	No. 27. Chester	..	..	..	..	..	American Brown Boveri Elec Corp.	1929	1930								
,,	No. 28. Louisville	10,000	600	65¼	19½	107,000	Puget Sound Navy Yard	1930	1931	..	..	..	9 8-*in.*, 4 5-*in.* A.A., 2 catapults, 4-6 seaplanes	6 21-in.	32·7	..	..
,,	No. 29. Chicago	..	..	..	..	..	Mare Island Navy Yard	1930	1931	2,280,000							
,,	No. 30. Houston						Newport News S. B.	1929	1930								
,,	No. 31. Augusta See p. P101.	..	..	..	..	..	& D. D. Co.	1930	Bldg.								
,,	Cincinnati						Tacoma, Wash.										
,,	Concord See p. P103.	7050	555½	55⅓	14¼	90,000	Philadelphia (Cramp)	1921	1923	Cost and fee	2½ side	..	12 6-*in.*, 4 3-*in.* A.A., 2 3-*pr.*, 2 catapults, 3 aeroplanes	6	33·7	— / 1800	450
,,	Detroit See p. P103.	7050	555½	55⅓	14¼	90,000	Quincy, Mass (Bethlehem)	1922	1923	Cost and fee.	2½ side	..	12 6-*in.*, 4 3-*in.* A.A., 2 3-*pr.*, 2 catapults, 3 aeroplanes	6	33·7	— / 1800	450

A.C.	Langley	10,286	542¼	65¼	19	7160 t	Mare Island Navy Yard	1912	1922*	..	..	..	4 *5-in.*, 30 aeroplanes, 2 catapults.	—	15	— 2000	410
l. c.	**Marblehead**						Philadelphia (Cramp)	1923	1924								
”	**Memphis**	7050	555½	55⅓	14¼	90,000		1924	1925	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A.; 2 *3-pr.*, 2 catapults, 3 aeroplanes.	6 21-in.	33·7	— 1800	450
”	**Milwaukee** *See p.* P103.						Tacoma, Wash.	1921	1923								
”	**Omaha**						Tacoma, Wash.	1920	1923								
”	**Raleigh**	7050	555½	55⅓	14¼	90,000	Quincy, Mass.	1923	1924	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A.; 2 *3-pr*, 2 catapults, 3 aeroplanes	6 21-in.	33·7	— 1800	450
”	**Richmond** *See p.* P103.						Philadelphia (Cramp)	1921	1923								
A.C.	**Ranger CV4**	13,800	..	..	..	53,500	S. B. & D. D. Co.	..	Bldg.	..	..	..	8 *5-in.* A.A., 75 aircraft	..	29½	..	1434
l. c.	**Salt Lake City**						American Brown Boveri Electric Corp.	1929	1929								
”	**Pensacola** *See p.* P102.	10,000	585½	64	19½	107,000	New York Navy Yard, New York	1929	1930	3,400,000	..	..	10 *8-in.*, 4 *5-in.* A.A., 2 *3-pr.*, 2 catapults, 4 planes	6 21-in.	32½	— 3000	620
”	**Trenton** *See p.* P103.	7050	555½	55⅓	14¼	90,000	Philadelphia (Cramp)	1923	1924	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 catapults, 3 aeroplanes	6 21-in.	33·7	— 1800	450
A.T.	**Wright**	9553	448	58	30	6000	Tietgen and Lang New York	1920	1921	..	..	..	2 *5-in.*, 2 *3-in.* A.A, 27 planes	—	15	— 1630	313

* As aircraft carrier. § Prices exclusive of armament.

3 Cruisers authorised, CL 39–41; to be laid down in 1933, '34, and '35. 5 Cruisers are projected, CL 42 to CL 46, but no money has yet been voted.

GUNBOATS.—Tulsa (1923), Asheville (1920), 1575 tons, 12 knots, 3 4-in., 2 3-pr., 2 1-pr., 4 M.; Helena (1897) 1392 tons, 15½ knots, 8 4-in., 4 3-pr.; Sacramento (1914), 1425 tons, 12½ knots, 3 4-in., 2 3-pr., 2 1-pr.; and 7 others, about 900 tons, used for training purposes.

RIVER GUNBOATS.—Guam (1927), Tutuila (1928), 380 tons, 14 knots, 2 3·3-in., 8 M.; Palos, Monocacy (1914), 190 tons, 13¼ knots, 2 6-pr.; Panay, Oahu, 410 tons, 15 knots, 2 3·3-in.; Luzon, Mindanao, 575 tons, 16 knots, 2 3·3-in.

MINELAYERS.—San Francisco (1890), 4080 tons, 19 knots, 4 5-in., 4 6-pr., 2 3-in. A.A., 4 1-pr., 300 mines; Baltimore (1889), 4413 tons, 20 knots, 4 5-in., 4 6-pr., 2 3-in. A.A., 2 1-pr., 300 mines; Oglala (1918), 4950 tons, 20 knots, 1 5-in., 2 3-in. A.A., 350 mines; 14 light mine-layers, *ex*-T.B.D.'s. See Flotilla Tables, p. 361.

MINE-SWEEPERS.—42 in number, "Bird" class (1918, 1919), 950 tons, 14 knots, 2 3-in. A.A.

AIRCRAFT TENDERS.—Patoka (1919), 16,800 tons, 10·9 knots, 2 5-in.; Heron (1918), 950 tons, 14 knots, 2 3-in. A.A.; Jason (1913), 19,250 tons, 14·3 knots, 4 4-in., 27 planes. Aroostook (1918) (minelayer), 4950 tons, 15 knots.

DESTROYER TENDERS.—Dobbin, 12,450 tons; Whitney, 12,450 tons; Altair, Denebola, Rigel, 10,000 tons; Melville, 7150 tons; Black Hawk, 8900 tons; Bridgeport, 11,750 tons.

SUBMARINE TENDERS.—Holland (1926), 11,570 tons, 16 knots, 8 5-in., 4 3-in. A.A., 2 6-pr.; Bushnell, Fulton, Canopus, Camden, Savannah, Beaver, and Argonne.

REPAIR SHIPS.—Medusa (1924), 9960 tons, 16 knots, 4 5-in., 2 3-in. A.A., 2 6-pr.; Vestal, Prometheus (1909), 8100 tons, 16 knots, 4 5-in. 27 submarine chasers mounting 1 3-in. gun.

Store ships, Cargo ships, Transports, Hospital ships, Patrol vessels, and other auxiliaries.

SHIPS OF THE LESSER NAVIES.

Austria.—Patrol vessels: Neretva, Compo (1918), 130 tons, 16 knots; Fogas (1916), 62 tons, 16 knots, and Pozsony (1918), 130 tons, 16 knots. These vessels have been disarmed and are unserviceable.

Bulgaria.—Under the terms of the naval clauses of the Peace Treaty, Bulgarian warships of all classes, existing or under construction, were surrendered to the Allied and Associated Powers or broken up. All vessels are under the Ministry of Commerce for police and preventive duties; torpedo boats Derzki, Khrabri, Smelyi, and Strogi, two minesweepers and some motor boats of little value.

China.—Cruisers: Chao Ho (Elswick, 1912, 2600 tons), Ying Jui (Barrow, 1912, 2750 tons, 20 knots)—two 6-in., four 4-in., two 3-in., six 3-pr., two 1-pr., two 18-in. torpedo tubes; Hai Yung, Hai Chou, and Hai Chen (Germany, 1897–1898, 2950 tons, 19½ knots)—three 5·9-in., eight 4-in. and smaller, one submerged torpedo tube; Hai Chi (Armstrong's, 1899, 4300 tons, 24 knots) —two 8-in., ten 4·7 in., twelve 3-pr., ten maxims, five torpedo tubes. A new cruiser is projected. Destroyers: Chien Kang, Hsiao An, and Yu Chang, of 390 tons, speed 30 knots, armament: two 3-in., four 3-pr., and two 18-in. T.T. Torpedo boats: Eight. Gunboats: Eight are under construction. River gunboats: Forty-two. Also several dispatch vessels and torpedo gunboats. There are, in addition, a few gunboats and miscellaneous vessels belonging to the water-police of the Kwang Tung Province. One seaplane carrier, Teuck Sheng, building.

Colombia.—Gunboats: Chercinto (1897), 640 tons; Cartagena, Santa Maria, Barranquilla (Yarrows, 1930), length 130 feet, speed 16 knots; four Guardacostas (Yarrow, 1913), 20 tons, and three of 150 tons, 13 knots, two 3-pr. River gunboats, General Nerino and Esperanza, 400 tons, 15 knots. Six revenue cutters building at Thornycroft's.

Cuba.—Light cruiser, Cuba, 2055 tons, 6000 H.P. 18 knots two 4-in., four 6-pr., four 3-pr., four 1-pr., 2 M., and the training ship Patria, 1220 tons, 16 knots; also 10 gunboats, Habana, Pinar del Rio, Villas, Matanzas, 80 tons, 12 knots, one 1-pr.; 24 de Febrero, 10 de Octubre, 218 tons, 12 knots, three 3-pr.; Baire, 500 tons, 14 knots, four 3-in., two 3-pr., 1 M.; Yara, 450 tons, 12 knots; 20 de Mayo, 200 tons, 12 knots; Enrique Villuendas, 178 tons, 16 knots. One patrol boat building, 115 tons, 3 guns.

Czecho-Slovakia.—There are two river gunboats for training purposes and four small minelayers.

Ecuador.—The torpedo cruiser Libertador Bolivar (1896), of no fighting value, mine-laying torpedo boat Tarqui, and gunboat Cotopaxi (1884).

Esthonia.—The Navy consists of destroyers Vambola (*ex*-Kapitan Kingsbergen) (1918), 1260 tons, 35 knots, four 4-in. guns, 2 M., one 2-pr., 9 T.T., 80 mines, and Lennuk (*ex*-Avtroil) (1917), 1350 tons, 35 knots, five 4-in. guns, 2 M., one 2-pr., 9 T.T., 80 mines. Two mine-layers, two minesweepers, two ice-breakers, and Peipus Lake gunboats Ahti and Tartu. Torpedo boat Sulev (*ex*-German A 32) (1917), 243 tons, 26 knots, two 3-in., 2 torpedo tubes; gunboat Laene, river gunboat Mardus.

Finland.—Patrol boats Klas Horn (*ex*-Posadnik), Uusimaa, Hämeenmaa, Matti Kurki (*ex*-Voevoda), Karjala (*ex*-Filin), and Turunmaa (*ex*-Orlan); also 2 torpedo boats, S1, S5; 5 C.M.B.'s, and 2 building; 6 ice-breakers, and three minesweepers, and several motor launches. Two armoured gunboats, Väinämöinen and Ilmarinen, 8350 tons, 15 knots, four 10-in. guns, eight 4·7-in guns, built at A/B Maskin and Brobyggnads, Abo. Submarines Vetehinen, Vesihiisi, completed in 1930 at A/B Maskin and Brobyggnads, Abo, 450 tons, speed 15 knots surface, 9 knots submerged, and another building. Submarine-minelayer Saukko, 99 tons, building at Helsingfors.

Hayti.—Four special service vessels, Nord Alexis, 1230 tons, Veretieres, 270 tons, 17 Decembre, 851 tons, Pacifique, 488 tons.

Hungary.—Patrol vessels: Sopron, Debreczen, 138 tons, four 3-in., 4 M.; Kecskemet, 131 tons, four 3-in., 4 M.; Birago, 59 tons, one 3-in., 2 M.; Szeged, 131 tons, four 3-in., 4 M.; also 12 motor launches.

Latvia.—Gunboat Virsaitis (*ex*-German M68), 480 tons, two 3-in., two 6-pr., one 3-in. A.A., one torpedo tube; 1 ice-breaker, Krisjanis Valdemars; 2 submarines, Ronis and Spidola, $\frac{390}{514}$ tons $\frac{\text{surface}}{\text{submerged}}$ displ., launched 1926, completed 1927, $\frac{14\frac{1}{2}}{9\frac{1}{4}}$ knots, one 3-in., 2 M., 6 torpedo tubes, complement 27; 2 minesweepers, Imanta, Viesturs, 225 tons, 14 knots, one 3-in., 4 M., 30 mines, completed in 1926.

Mexico.—Coast defence vessel Anahuac, 3162 tons, 15 knots, two 9·4-in., four 4·7-in., four 6-pr., 2 M., 2 L.; gun-vessels, Tampico and Vera Cruz (Elizabeth Port, New Jersey, 1903); displacement, 980 tons; armament, two 4-in. Q.F., four 6-pr.; 16 knots; fitted to serve as transports for 200 troops, Bravo 1200 tons; 2,600 I.H.P.; 17 knots (Leghorn, 1904), and Aguas Prieta, 1200 tons; 1800 I.H.P.;

15 knots. Training ship Zaragoza, 1200 tons, 1300 H.P., 15 knots, five 4·7-in., and one 6-pr. Q.F. Two revenue cutters.

Paraguay.—Gunboats Humayta and Paraguay (1931), 740 tons, 17 knots, four 4·7-inch, four 3-inch A.A. guns. Five older vessels of about 100 tons.

Peru.—Almirante Grau and Coronel Bolognesi, cruisers 3200 tons; (Barrow, 1906); two 6-in., eight 3-in., eight maxim; 2 submerged torpedo tubes; 24 knots; converted to oil-burning 1925; also Lima (1880, refitted 1920) (parent ship for submarines), 1790 tons. Gunboat America, 200 tons, 14 knots. Destroyer, Rodriguez, 500 tons, 28 knots. Submarines R1 and R2, 1926, built at New London, S. and E. Co., Croton Works, U.S.A., $\frac{576}{682}$ tons, $\frac{14\frac{1}{2}}{10}$ knots, one 3-in., 4 torpedo tubes. Submarines R3, R4 (1929), built at Electric Boat Co. (New London Ship and Eng. Co., Croton, Mass.), same particulars as R1 and R2. R5 and R6 authorised for building by Electric Boat Co. (New London Ship and Eng. Co., Croton, Mass.) Two destroyers are projected.

Poland.—Five *ex*-German torpedo boats for police purposes. Gunboats Komendant Pilsudski and General Haller, 350 tons, carrying several small guns, built in Finland (1920). Training ship Iskra. Monitors Warszawa, Horodyszcre, Krakow, Wilno, Torun, Pinsk. Four minesweepers, 200 tons, and about twenty-four motor boats. Two destroyers, Burza, Wicher, completed 1930 at Chantiers Navals Français, 1515 tons, 33,000 H.P., 33 knots, four 5·1-in., one 2·9-in. A.A., 6 torpedo tubes. Three submarine minelayers built in France, Rys, Zbik, and Wilk, completed 1930; $\frac{964}{1230}$ tons, $\frac{1800}{1200}$ H.P., 14 knots surface, 9·5 knots submerged; one 4-in., one 2-pr., 6 torpedo tubes, 40 mines. Six more are projected.

Portugal.—The cruiser Adamastor, 1760 tons, 18 knots (Leghorn in 1897, reconditioned in 1925), two 4·7-in., four 4·1-in., four 3-pr., 3 maxim, 3 torpedo tubes (14-in.). The minelayer Vulcano (151 tons) was built by Messrs. Thornycroft in 1909. Two sloops, about 1200 tons, sold out of the British Navy, Carvalho Araujo (*ex*-Jonquil) and Republica (*ex*-Gladiolus). Coast defence vessel Vasco da Gama (1876, reconstructed 1903), 3030 tons, 15·5 knots, mounting two 8-in., one 6-in., one 4-in., one 3-in., four 3-pr. Destroyers Douro, Tamega. Guadiana (1913–24), 700 tons, 11,000 H.P., 30 knots, one 4-in., two 3-in., two torpedo tubes, also four *ex*-Austrian F boats for police duties. Submarines Foca, Golfinho, and Hidra (Laurenti); 260–389 tons, 13–8·5 knots, 2 T.T. Gunboats Damao and Zaire (1919), and Diu (building at Lisbon), 400 tons, 700 H.P., 13 knots, two 3-in., two 3-pr., and there are 11 older ones. Lagos and Faro fishery inspection vessels. Three gunboats are projected.

Four destroyers (about 1400 tons) are being built by Yarrow's, two sloops by Hawthorne Leslie, Newcastle, and an aircraft carrier (4500 tons), two submarines (700–800 tons), and two dispatch boats (2000 tons) are being built in Italy.

Rumania.—Two flotilla leaders, Regele Ferdinand and Regina Maria, to Messrs. Thornycroft's design, built at Pattison's Yard, Naples, completed 1930, 1968 tons, 38 knots. Length 334¾ ft., beam 31½ ft., draught 11¼ ft. Armament, five 4·7 in., three 2-pr. A.A.; two twin torpedo tubes.

One submarine, Delphin, built at Quarnaro, Fiume. Displacement, 640 tons surface, 817 tons submerged; speed 14 knots surface, 9·5 knots submerged, one 4·2-in. gun, 8 torpedo tubes.

River Monitors.—Bucovina (1916), 540 tons, 12 knots, two 4·7-in., two 3-pr., two 11-pr. A.A.; Ardeal (1905), 440 tons, 10 knots, two 4·7-in., one 3-pr., one 3·5-in. A.A.; Basarabia (1915), 530 tons, 12 knots, two 4·7-in., two 3-pr., two 11-pr. A.A.; Lascar Catargiu, Ioan Bratianu, Milhail Kogalniceanu, Alexandru Lahovary (1907–08), 670 tons, 13 knots, three 4·7-in., two 3-pr., one 3-in. A.A., 2 M.

Flotilla Leaders.—Marasti, Marasesti (*ex*-Italian Nibbio, Sparviero), completed 1917–18, reconditioned 1926, 1460 tons, 35 knots, five 4·7-in., four 3-in. A.A., 2 M., 2 twin torpedo tubes, 50 mines.

Seven vedettes, 50 tons.

Gunboats.—Stihi, Lepri Remus, Dumitrescu, Ghiculescu, completed 1916–17, 350 tons, 15 knots, two 3·9-in., 2 M. These are *ex*-French vessels.

There are also five armed motor boats, police craft (*ex*-Austrian T.B.D.'s), Naluca, Sborul, Zmeul, and about seven armed launches.

A submarine depôt ship, Constanta, 2264 tons, is building at Cantiere Navali de Quarnaro, Fiume. Launched 1928.

Siam.—The gunboats Ratnakosindr, 1925, 920 tons, two 6-in., four 3-in. H.A., 12 knots; Bali and Sugrib, 580 tons, 11·5 knots, one 4·7-in., five 6-pr., 2 M.; Muratha, 530 tons, 11·4 knots, one 4·7-in., four 6-pr., 3 M.; and Mongkut, 700 tons, 11 knots, two 4·7-in., two 6-pr., three 3-pr., launched 1898, 1901, 1898, and 1887 respectively. One river gunboat, built at Vickers-Armstrongs', Barrow, the Sukhodaya, completed 1930, 1030 tons, 13 knots, two 6-in., four 3-in. A.A. One despatch vessel, Pi Sua Nam, 195 tons. Two 380-ton, 27-knot destroyers, built at Kobe, Sua Gamron Sindhu and Sua Tayanchou. Phra Ruan (*ex*-British destroyer Radiant, 1917), 1035 tons, 35 knots, 4 torpedo boats. Four coastal motor boats with 2 torpedo tubes (18-in.). Training ship Chao Phra (1919), 840 tons, 16 knots.

Turkey.—The old battleship Torghud Reis (*ex*-German Weissenburg, 1891), refitted 1927, 9900 tons, 17 knots, six 11-in.,

·three 15-pr., two 2·5-in. A.A., 2 submerged torpedo tubes. The battle-cruiser Yavouz Sultan Selim (*ex*-Goeben), 24,000 tons, 25 knots. Armament: ten 11-in., twelve 5·9-in., twelve 22-pr., 2 M., 1 L., 4 submerged torpedo tubes. Light cruisers: Hamidieh (Elswick, 1904), 3830 tons, speed 22 knots, armament: two 5·9-in., four 3-in., four 3-pr., 2 torpedo tubes; Medjidieh (Philadelphia, 1903), refitted 1927, 3300 tons, speed 22 knots, armament: four 5·1-in., four 3-in., 4 M. Destroyers Adatepe, Kocatepe built at Messrs. Ansaldo, Italy (1931), 1430 tons, 39 knots, four 4·7-in. guns, 6 tubes, and two building (Tinaztepe and another) at Cantiere Navale del Tirreno, Italy, 1350 tons, 38 knots, four 4·7-in. guns, 6 21-in. tubes. Submarines Ikindji-in-Uni and Biriudjiin-Uni, completed 1928, at Fijenoord Works, Rotterdam, $\frac{433}{556}$ tons, $\frac{13\frac{3}{4}}{9\frac{3}{4}}$ knots, one 3-in., 1 M., 6 torpedo tubes. Two submarines, Sakarya and Dumlupinar (minelayer), building at Monfalcone, 700–950 tons surface displacement, and about 15 knots surface speed.

Uruguay.—Old light cruiser Monte Video (1890), 2050 tons, torpedo-gunboat (training ship) Uruguay (Vulcan, Stettin, 1910), 1400 tons; two 4·7-in., four 3-in., six 1-pr., four Maxims; two 18-in. torpedo tubes. Surveying ships Baron de Rio Branco, Zapican, Charrua, built in Germany. Two destroyers and 3 torpedo boats are projected, but no money has been voted for them.

Venezuela.—Old gunboats Mariscal Sucre (*ex*-Spanish Isla de Cuba), drill ship bought from United States, 1912. General Salom, Miranda. Armed tug José Felix Ribas. Transport Antonio Diaz.

Yugoslavia.—Submarines Hrabri and Nebojsca, completed at Armstrong's 1928, displacement 975 tons surface, 1164 tons submerged; speed $15\frac{3}{4}$ knots surface, 10 knots submerged; mount two 4-in., 6 torpedo tubes. Smeli and Osvetnik, completed at Nantes, 1929; displacement 620 tons surface, 797 tons submerged, speed 14·5 knots surface, 9·25 knots submerged, carry one 4-in., one 2-pr., and 6 torpedo tubes. Two coastal motor boats, 38 knots, built at Thornycroft's, completed in 1927. Old cruiser Dalmacija (*ex*-German Niobe), refitted 1926, 2600 tons, is used as a gunnery and general training ship. There are four *ex*-Austrian river monitors, Vardar, Drava, Sava, Morava, 430–600 tons, mounting two 4·7-in.; eleven *ex*-Austrian T.B.D.'s, two patrol boats, six mine-layers, four mine-sweepers (*ex*-Austrian T.B.D.'s), five transports, one training ship, one submarine depôt ship, and auxiliary craft.

One flotilla leader, Dubrovnik, building at Yarrow's, laid down 1930, launched 1931, length 371 feet, displacement 2400 tons, 42,000 S.H.P., speed 37 knots, carries four 5·5-in., 2 twin 2-pr., 2 triple torpedo tubes.

BRITISH AND FOREIGN FLOTILLAS.

Great Britain.

Name or Number.	Built by.	Completed.	Dimensions. Length (Extreme).	Beam.	Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).	Fuel Capacity. Oil.
FLOTILLA LEADERS.			ft. ins.	ft. ins	ft. ins.		Tons.		Knots.				Tons.
Duncan	Portsmouth Dockyard	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Kempenfelt	J. S. White	1931	..	..	..	..	1390	..	..	..	..	..	..
Keith	J. S. White	1931	323 0	32 3	8 6	2	1350	34,000	35	4 4·7 in., 2 2-prs.	2 Q	..	380
Codrington	Swan Hunter	1930	343 0	33 9	10 0	2	1520	39,000	35	5 4·7-in., 2 2-prs., 1 M., 4 L.	2 Q.	..	425
Abdiel	Cammell Laird	1916	325	31 9	11 3	3	1310	36,000	34	3 4-in., 1 2-pr., 1 M., 4 L., Mine-layer.	2 D.	130	515
Shakespeare	Thornycroft	1917											
Spenser	"	1917											
Wallace	"	1919	329	31 11	12 4	2	1480	40,000	36	5 4·7-in. 1 3-in. A.A. 2 2-pr. A.A. 1 M., 4 L.	2 T.	182	500
Keppel	"	1925											
Broke, *ex*-Rooke	"	1925											
Bruce		1918											
Douglas		1918											
Campbell	Cammell Laird	1918											
Mackay, *ex*-Claverhouse		1919	332 6	31 9	12 3	2	1530	40,000	36·5	5 4·7-in. 1 3-in. A.A. 2 2-pr. A.A. 1 M., 4 L.	2 T	182	500
Malcolm		1919											
Montrose	Hawthorn Leslie	1918											
Stuart	" "	1918											

1 Flotilla leader is authorised for commencement in **1932**.

DESTROYERS.

Name or Number.	Built by.	Completed.	Dimensions. Length (Extreme.)	Beam.	Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).	Fuel Capacity. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Defender	Vickers												
Diamond													
Daring	Thornycroft												
Decoy													
Dainty	Fairfield	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Delight													
Diana	Palmers												
Duchess													
Crusader	Portsmouth Dockyard												
Comet		Bldg.	..	..	..	..	1375	..	..	..	..	.	..
Cygnet	Vickers-Armstrongs												
Crescent													
Basilisk	Brown												
Beagle	"												
Blanche	Hawthorn, Leslie												
Boadicea	" "	1931	323	32¼	8½	2	1330	34,000	35	4 4·7in., 2 2-pr.	2 Q.	..	380
Boreas	Palmers												
Brazen	"												
Brilliant	Swan, Hunter												
Bulldog	" "												
Acasta	Brown	1930											
Achates	Brown	1930											
Acheron	Thornycroft	1931											
Active	Hawthorn Leslie	1930	323	32¼	8¼	2	1330	34,000	35	4 4·7 in., 2 2-pr., 1 M., 4 L.	2 Q.	..	380
Antelope	Hawthorn Leslie	1930											
Anthony	Scotts	1930											
Ardent	Scotts	1930											
Arrow	Vickers Armstr.	1930											
Amazon (*T*)	Thornycroft	1927	323	31½	9	2	1352	42,270 *t*	37·96 *t*	4 4·7-in , 2 2-pr.	2 T.	140	433
Ambuscade (*Y*)	Yarrow	1927	322	31	8¼	2	1173	32,850 *t*	37·19 *t*	4 4·7-in., 2 2-pr.	2 T.	140	385

Torpedo tubes : D. = double. T. = triple. Q. = quadruple.
T. = Thornycroft design. *Y.* = Yarrow design.

Great Britain—*continued.*

Name or Number.	Built by.	Completed.	Dimensions. Length (extreme).	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).	Fuel Capacity. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Admiralty "S" Class:													
Sabre	Stephen	1918											
Shamrock	Doxford	1919											
Saladin	Stephen	1919											
Sardonyx	"	1919											
Scimitar	Brown	1918											
Seafire	"	1918											
Searcher	"	1918											
Sepoy	Denny	1918											
Seraph	"	1918											
Serapis	"	1919											
Serene	"	1919											
Sesame	"	1919											
Sirdar	Fairfield	1918											
Somme	"	1918											
Steadfast	Palmer	1919											
Sterling	"	1919											
Spindrift	Fairfield	1919	276	26¾	10⅝	2	905	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Turbulent	Haw. Leslie	1919											
Tenedos	"	1919											
Thanet	"	1919											
Thracian	"	1922											
Stormcloud	Palmer	1920											
Strenuous	Scott	1919											
Stronghold	"	1919											
Sturdy	Scott	1919											
Sportive	Swan Hunter	1918											
Swallow	Scott	1918											
Trojan	J. S. White	1918											
Trusty	" "	1919											
Senator	Denny	1918											
Scout	Brown	1918											
Scotsman	"	1918											
Shikari	Doxford / Chatham	1924											
Admiralty "V" Class:													
Vansittart	Beardmore	1919											367
Venomous	Brown	1919											353
Verity	"	1919	312	29½	10⅝	2	1120	27,000	34				363
Volunteer	Denny	1919											370
Veteran	Brown	1919											363
Wanderer	Fairfield	1919											367
Witch (*T.*)	Thornycroft / Devonport	1925	312	30½	10·9	2	1140	30,000	35	4 4·7 in., 2 2-pr., 1 M., 4 L.	2 T.	130	365 374
Wishart (*T*)	Thornycroft	1920											370
Wren	Yarrow	1923											368
Whitshed	Swan Hunter	1919											368
Wild Swan	" "	1919											365
Witherington	J. S. White	1919											365
Wivern	" "	1919	312	29½	10⅝	2	1120	27,000	34				365
Wolverine	" "	1920											365
Worcester	" "	1922											
Whitehall	Swan Hunter / Chatham	1925											365
Walpole	Doxford	1918											
Whitley	"	1918											
Waterhen	Palmer	1918	312	29½	10⅝	2	1100	27,000	34				367
Wryneck	"	1918											
Windsor	Scott	1918								4 4in., 1 2-pr., 1 M., 4 L.	2 T.	120	
Wrestler	Swan Hunter	1918											
Woolston (*T*)	Thornycroft	1918	312	30½	10¾	2	1120	30,000	35				374
Wolsey (*T*)	"	1918											374
Wessex	Haw. Leslie	1918											369
Winchester	J. S. White	1918	312	29½	10·7	2	1100	27,000	34				369
Wolfhound	Fairfield	1918											369

Y = Yarrow design. *T* = Thornycroft design.

Great Britain—*continued.*

Name or Number.	Built by.	Completed.	Dimensions. Length. (Extreme)	Beam.	Draught.	Number of Screws.	Standards Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Admiralty "V" Class—contd.													
Westminster	Scott	1918											
Westcott	Denny	1918											
Wakeful	Brown	1917											
Walker	Denny	1918											
Walrus	Fairfield ..	1918	312	29½	10 7	2	1100	27,000	34				
Warwick	Haw. Leslie ..	1918											
Watchman	Brown	1918											
Whirlwind	Swan, Hunter ..	1918								4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120	367
Winchelsea	J. S. White ..	1918											
Voyager	Stephen ..	1918											
Vanessa	Beardmore ..	1918											
Vanity	" ..	1918											
Vidette	Stephen ..	1918											
Vivien	Yarrow ..	1918											
Valhalla	C. Laird ..	1917											
Valentine	"	1917											
Valkyrie	Denny	1917								4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120	369
Valorous	"	1917											
Vampire	J. S. White ..	1917											
Vimy (*late* Vancouver)	Beardmore ..	1918								4 4-in., 1 2-pr., 1 M., 4 L.	1 T. 1 D.		
Vanoc	Brown	1917								4 4-in., 1 2-pr. A A., 1 M., 4 L.	2 T.		
Vanquisher ..	"	1917	312	29½	10¾	2	1090	27,000	34				
Vectis	J. S. White ..	1917									2 T.		
Vega	Doxford ..	1917											
Velox	" ..	1918											
Vendetta	Fairfield ..	1917								4 4-in.,	1 T.,		
Venetia	" ..	1917								1 2-pr.,			
Venturous	Denny	1917								1 M., 4 L.	2 T.	120	370
Verdun	Haw. Leslie ..	1917											
Versatile	" ..	1918	..	..	..	..	..	..	..		1 T., 1 D.		
Vesper	Stephen ..	1918											
Vimiera	Swan Hunter ..	1917									2 T.		
Violent	" " ...	1917								4 4-in.,			
Vivacious	Yarrow ..	1917								1 2-pr.,			
Vortigern	J. S. White ..	1918								1 M., 4 L.	1 T. 1 D.		
Viceroy (*T*) ..	Thornycroft ..	1918	312	30½	10¾	2	1120	30,000	35		2 T.		
Viscount (*T*) ..	" ..	1918											
Admiralty "R" Class;													
Tempest	Fairfield ..	1917	275½	26¾	10⅝	2							
Tetrarch	H. & Wolff ..	1917	275¾	26¾	10⅝	2							
Thisbe	Haw. Leslie ..	1917	275½	26¾	10⅝		900	27,000	36			98	296¼
Thruster	" ..	1917				2				3 4-in.,	2 D. (Restless has 1 D.)		
Torrid	Swan Hunter ..	1917	275¾	26¾	10⅝					1 2-pr.,			
Tyrant (*Y*) ..	Yarrow ..	1917	271½	25¾	9½	2	760	23,000	36	1 M.,		98	300 (*Y*) 256
Skate	Brown	1917	276	26¾	10⅝					4 L.			
Rowena	"	1916	275½	26¾	10⅝	2	900	27,000	36				
Restless	"	1916											
Salmon	H. & Wolff ..	1916	275¾	26¾	10⅝								

8 Destroyers are authorised for commencement in 1932.

Great Britain—*continued.*

SUBMARINES.

Name or Number.	Where Built.	Completed.	Dimensions. Length. (Extreme)	Beam	Draught.	No. of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement (War).	Fuel Capacity Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Starfish	Chatham ..												
Seahorse		Bldg.	..	..	..	..	..	..	..	..	..	..	..
Porpoise	Vickers ..												
Swordfish	Chatham ..	Bldg.	187	..	..	..	640/—	..	..	3-in. gun	..	..	..
Sturgeon													
Thames	Vickers-Armstrong	Bldg.	325	..	..	..	1,760/—	..	..	4·7-in. gun	..	..	..
Rainbow	Chatham ..	1931											
Regent ..	Vickers-Armstrong	1930	290	..	..	..	1,475/2,010	..	..	..	..	55	..
Regulus		1930											
Rover ..		1931											
Parthian	Chatham ..		..	..	..	..	1,475/2,040	4,400/1,320	17-17½/9	..	8	..	..
Perseus	Vickers-Armstrong												
Proteus		1930	290	..	..	..	1,475/2,040	..		1 4-in. (Perseus has 1 4·7 in.)			
Pandora													
Phœnix	Cammell Laird												
Odin ..	Chatham ..	1929				..							
Olympus	Beardmore ..	1930				..							
Orpheus	Beardmore ..	1930	283½	29·8	14·3	..	1,475/2,030	4,400/1,320	17-17½/9	1 4-in.	8	53	174
Osiris ..	Vickers ..												
Oswald	Vickers ..	1929								..	..	..	..
Otus ..	Vickers ..					..			..				
Oberon	Chatham ..	1927	270	28	13·5	..	1,380/1,800	2950/1350	15/9	1 4-in.	8	52	200
X1 ..	Chatham ..	1925	363½	29·8	15·7	..	2,525/3,600	7,000/2,600	19½/9	4 5·2 in., 2 Lewis	6	100	450
R4 ..	Chatham ..	1919	163	15·5	11·6	..	420/500	240/1,200	9½/15	1 L.	6	23	23
M3 (late K20)	Armstrong ..	1920	303	24·5	15·75	..	1,600/1,950	2,400/1,600	15½/9½	4 L.	4	68	110
M2 (late K19	Vickers ..	1920	296	24·5	15·75	..	1,600/1,950	2,400/1,600	15½/9½	1 3-in., 2 Lewis	4	70	110
L71 ..	Scott's ..	1920											
L69 ..	Beardmore ..	1923								2 4-in., 1 Lewis			
L56 ..	Fairfield ..	1919											
L54 ..	Denny ..	1924	235	23·5	13·2	..	870/1,150	2,400/1,600	17½/10½	1 4-in., 1 Lewis	6	44	110
L53 ..	Armstrong ..	1925								2 4-in., 1 Lewis			
L52 ..	Armstrong ..	1921											
L33 ..	Swan Hunter	1919											
L27 ..	Vickers ..	1926											
L26 ..	Vickers ..	1926											
L25 ..	Vickers ..	1920											
L23 ..	Vickers ..	1924								1 4-in., 1 Lewis	4	41	
L22 ..	Vickers ..	1921											
L21 ..	Vickers ..	1920											
L20 ..	Vickers ..	1919											
L19 ..	Vickers ..	1919	238½	23½	11·7	..	800/1,080	2,400/1,600	17½/10½				76
L18 ..	Vickers ..	1919											
L17 ..	Vickers ..	1918								1 Lewis, 16 mines	4	41	
L16 ..	Fairfield ..	1918								1 4-in., 1 Lewis	4	41	
L15 ..	Fairfield ..	1918									4	41	
L14 ..	Vickers ..	1918								1 Lewis, 16 mines	4	41	
L12 ..	Vickers ..	1918								1 4-in., 1 Lewis	6	41	
L11 ..	Vickers ..	1918									6	41	
H50 ..	Beardmore ..	1920											
H49 ..	Beardmore ..	1919											
H48 ..	Beardmore ..	1919											
H44 ..	Armstrong ..	1920											
H43 ..	Armstrong ..	1919											
H34 ..	Cammell Laird	1919											
H33 ..	Cammell Laird	1919	171	15·75	13	..	440/500	480/320	13/10½	1 Lewis	4	23	16
H32 ..	Vickers ..	1919											
H31 ..	Vickers ..	1919											
H30 ..	Vickers ..	1918											
H28 ..	Vickers ..	1918											
H27 ..	Vickers ..	1913											
H24 ..	Vickers ..	1918											
H23 ..	Vickers ..	1918											

3 submarines are authorised for commencement in 1932.

Great Britain—*continued.*

Sloops.

Name.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Coal. / Oil.	Complement.
Sloops.		ft. ins.	ft. ins.	ft. ins.									
Falmouth .							Hawthorn Leslie						
Milford .							Yarrow						
Weston-super-Mare	..	..	..	..	..	Devonport	Yarrow	..	..	..	..	..	..
Dundee .						Chatham	Hawthorn Leslie						
Bideford .						Devonport	J. S. White & Devonport	1931					
Rochester .						Chatham	J. S. White & Chatham	..					
Fowey .	1105*	281 4	35 0	8 0	2,000	Devonport	J. S. White & Devonport	1930	Bldg.	1 4-in., 1 4-in. A.A. 8 smaller	16½	— / 290	..
Shoreham .						Chatham	J. S. White & Chatham	1930					
Hastings .						Devonport	Devonport	1930					
Penzance .						Devonport	Devonport	1930					
Folkestone	1040*	250 p.p.	34 1	9 1	2,000	Swan, Hunter	Hawthorn, Leslie	1930	1930	1 4-in., 1 4-in. A.A. 6 smaller	16-16½	— / 280	..
Scarborough						Swan, Hunter	Hawthorn, Leslie	1930					
Bridgewater Sandwich	1040	266 4	34 0	8 6	2,000	Hawthorn Leslie	Hawthorn Leslie	1928	1929	1 *4-in.*, 1 4-in. A.A., 4 L.	17	— / 275	95
Harebell .	1345	274 9	35 0	12 0	2,500	Barclay Curle	Barclay Curle	1918	1918	2 *4-in.* 2 *12-pr.*, 2 L.	16·5	320 / —	115
Chrysanthemum	1345	276 0	35 0	13 3	2,500	Armstrong	Wallsend Slipway	1917	1918	2 *3-pr.*	16·5	260 / —	100
Bryony .	1345	275 3	35 0	12 10	2,500	Armstrong	Wallsend Slipway	1917	1917	4 *3-pr.*, 1 M. 8 L.	16·5	260 / —	70
Heather .	1260	277 9	33 6	11 10	2,500	Greenock & Grangemouth	Cooper & Greig	1916	1916	1 *4-in.*	16·5	260 / —	100
Cornflower						Barclay Curle	Barclay Curle	1916	1916	2 *4-in.*, 4 *3-pr.* A.A., 2 M., 8 L.	16·5	255 / —	100
Cyclamen .						Lobnitz	Lobnitz	1915	1916	2 *4-in.*, 4 *3-pr.* A.A., 2 *2-pr.*, 8 L.	16·5	255 / —	100
Delphinium						Napier & Miller	Dunsmuir & Jackson	1915	1916	2 *4-in.*, 4 *3-pr.* 1 *2-pr.*, 2 M., 8 L.	16·5	255 / —	118
Godetia .						C. Connell	Rowan	1916	1916	1 *4-in.*, 1 *12-pr.* 2 L.		255 / —	
Lupin .	1175	267 9	33 6	12 0	2,000	Simons	Simons	1916	1916	2 *4-in.*, 4 *3-pr.*, 1 *2-pr.*, 8 L.	16·5	— / 182	100
Rosemary						Richardson Duck	Blair	1915	1916	1 *4-in.*, 2 *2-pr.* 2 M., 8 L.		260 / —	
Snapdragon						Ropner	Blair						
Verbena .						Blyth Co.	Richardson's, Westgarth	1915	1916	2 *4-in.*, 4 *3-pr.* 2 *2-pr.*, 8 L.	16·5	255 / —	100
Heliotrope	1163	262 6	33 0	12 3	1,800	Lobnitz	Lobnitz	1915	1915	4 *3-pr.* 1 *4-in.*, 2 *2-pr.*, 2 M., 8 L.	16·5	250 / —	100
Daffodil .						Scott's	Scott's						
Magnolia .													
Laburnum						Connell	Rowan						
Veronica .	1165	262 6	33 0	12 6	1,800	Dunlop Bremner	Dunlop Bremner	1915	1915	2 *4-in.*, 4 *3-pr.* 2 *2-pr.*, 8 L. (Dahlia 1 *4-in.*)	16·5	250 / —	100
Dahlia .													
Foxglove .													

4 sloops are authorised for commencement in 1932.

* Estimated displacement.

Great Britain—*continued.*

Twin-Screw Minesweepers, River Gunboats.

Name.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Coal. / Oil.	Complement.
Twin-Screw Mine-sweepers.													
Aberdare						Ailsa	Ailsa	1918	1918				
Abingdon						Ailsa	G. Clark						
Albury						Ailsa	Ailsa	1918	1919				
Alresford						Ailsa	W. H. Allen	1919	1919				
Bagshot						Ardrossan Dry Dock Co.	W. H. Allen	1918	1919				
Derby						Clyde S.B. Co.	Clyde S.B. Co.	1918	1918	1 *4-in.*, 1 *12-pr.* A.A.			
Dundalk						Do.	Do.						
Dunoon						Do.	Do.						
Fermoy						Dundee S.B. Co.	Cooper & Greig	1919	1919				
Fareham						Dunlop, Bremner	Dunlop, Bremner	1918	1918				
Forres						Clyde S.B.Co	G. Clark	1918	1919	—			
Tiverton						Simons	Simons	1918	1918				
Elgin						Do.	Do.						
Caterham						Bow, McLachlan	Bow, McLachlan	1919	1919				
Carstairs	800	231 0	28 7	9 0	2,200	Do.	Do.			1 *4-in.*, 1 *12-pr.* A.A.	16	190 / —	75
Sutton						McMillan	Yarrow						
Saltash						Murdock & Murray	Do.	1918	1918				
Saltburn						Do.	Do.						
Selkirk						Do.	D. Rowan	1918	1919				
Petersfield						Lobnitz	Lobnitz	1919	1919	1 *4-in.*, 4 *3-pr.*			
Ross						Do.	Do.						
Widnes						Napier & Miller	Rowan						
Harrow						Eltringham	Wallsend Slipway	1918	1918	1 *4-in.*, 1 *12-pr.* A.A.			
Huntly						Do.	Eltringham						
Marazion						Fleming & Ferguson	Fleming & Ferguson	1919	1919	1 *6-pr.*			
Lydd						Fairfield	Fairfield	1918	1919				
Stoke						C. Rennoldson	Shields Eng. Co.	1918	1918	1 *4-in.*, 1 *12-pr.* A.A.			
Pangbourne						Lobnitz	Lobnitz					140 / —	
Tedworth						Simons	Simons	1917	1917	1 *3-in.* A.A.			35
River Gun-boats.													
Falcon	354	150 0	28 8	4 9	2,250	Yarrow	Yarrow	1931	1931	1 4·7-in., 2 6-pr.	15	— / 84	
Gannet	310	185 0	29 0	4 0	2,250	Yarrow	Yarrow	1927	1928	2 *3-in.* A.A., 8 L.	16	— / 60	60
Peterel								1927	1927				
Seamew	262	168 0	27 0	4 0	1,270	Do.	Do.	1928	1928		14	— / 50	60
Tern								1927	1927				
Aphis						Ailsa	Ailsa	1915	1915	2 *6-in.*, 1 *3-in.* A.A., 1 *2-pr.*, 8 L.		— / 100	
Bee						Do.	Do.	1915	1916	1 *6-in.*, 1 *3-in.* A.A., 2 *3-pr.*, 1 *2-pr.*, 8 L.			
Cicala						Barclay Curle	Barclay Curle	1915	1916	2 6-in., 1 *3-in.* A.A., 1 *2-pr.*, 8 L.		35 / 55	
Cockchafer						Do.	Do.	1915	1916	2 *6-in.*, 1 *3-in.* A.A., 8 L.			
Cricket						Do.	Do.	1915	1916	2 *6-in.*, 1 *3-in.* A.A., 1 *2-pr.*, 8 L.			
Gnat	625	237 6	36 0	4 6	2,000	Lobnitz	Lobnitz	1915	1915		14	— / 100	55
Ladybird						Do.	Do.	1915	1916	2 *6-in.*, 1 *3-in.* AA., 1 *2-pr.*, 8 L.			
Mantis						Sunderland S.B. Co.	N.E. Marine	1915	1915	2 *6-in.*, 1 *3-in.* A.A., 1 *2-pr.*, 8 L.		35 / 55	
Moth						Do.	Do.	1915	1916			— / 80	
Scarab						Wood, Skinner	Do.	1915	1915	2 *6-in.*, 1 *3-in.* A.A., 1 *2-pr.*, 8 L.		— / 105	
Tarantula						Do.	Do.	1915	1916			— / 105	
Teal													
Moorhen	180	165 0	24 6	2 3	670	Yarrow	Yarrow	1901 / 1904	1901 / 1904	2 *6-pr.*, 8 L.	13	35 / —	34
Widgeon													

A gunboat is authorised for commencement in 1932.

Argentine Republic.

Name or Number.	Where Built.	Launched	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
FLOTILLA LEADERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Cervantes (*ex*-Spanish Churruca) Juan de Garay (*ex*-Spanish Alcala Galiano)	Cartagena ..	1925	331¾	31¾	10½	2	1650	42,000	36	5 4·7 in., 1 3-in. A.A., 4 M.	2 triple	—	— / 540
Mendoza .. La Rioja .. Tucuman ..	J. S. White, Cowes	1928 1929 1929	335	31·8	9 2	2	1520	45,000	36·5	5 4·7 in., 1 3-in. A.A., 2 2-pr., 4 M.	2 triple	—	— / 700
DESTROYERS—													
Catamarca* .. .. Jujuy †	Schichau .. Germania ..	1911	288·7	27	8·6	2	950	18,000	32	3 4-in.	8 4	100	—
Cordoba* .. .. La Plata †	Shichau .. Germania ..	1910 1911	295	29·5	7·8	..	950	20,000	34·7 *t.*	3 4-in.	8 4	100	—
SUBMARINES—													
Santa Fe .. .. Salta .. .. .. Santiago del Estero	Tosi Taranto	1931 Bldg.	221½	21½	13	2	850 / 1080	3,000	17·5 / 9	1 4·7 in.	8	—	—

* Converted to oil-burning, 1927, at Buenos Aires. † Being converted to oil-burning at Buenos Aires.
3 flotilla leaders and 3 submarines are projected.

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions. Length (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Para		1908						7,014	27·26				
Amazonas		1908						6,898	27·17				
Piahuy		1908						6,563	27·21				
Matto Grosso		1908						7,403	27·16				
Parahyba		1909	240 p.p.	23·6	7·5	2	560	6,700	27·29	2 4-in., 4 3 prs.	2	75	140 / —
Rio Grande del Norte	Yarrow ..	1909						7,778	27·27				
Alagoas		1909						7,403	27·25				
Santa Catharina ..		1909						6,982	27·30				
Parana		1910						8,877	28·74				
Sergipe		1909						8,554	27·60				
Maranhao	Thornycroft..	1913	265·3	26·5	10	..	934	22,500	31	3 4-in., 1 2-pr.	2 dble.	..	— / 250
TORPEDO BOATS—													
Goyaz	Yarrow ..	1907	152·5 p.p.	15·3	4·3	3	150	..	26·5	2–3 prs.	2	..	..
SUBMARINES—													
Humayta	Spezia (Ansaldo Fiat)	1927	282	25·6	15·2	2	1370 / 1850	4,800	18·5 / 10	1 4-in. A.A.; carries mines	6 21-in.	55	— / 140
F 1 .. .. F 3 .. .. F 5	Spezia (Fiat)	1913	150	13·6	12	..	250 / 370	800 / 500	13·5 / 8	..	2 21-in.	..	..

Chile.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Serrano Orella Riquelme Hyatt Videla Aldea	Thornycroft's	1928	300	29	9·3	2	1090	28,000	35	3 4·7-in., 1 3-in.	2 triple	130	— / 340
Almirante Lynch, Condell	White	1912 1913	320 p.p.	32·6	11·1	3	1850	30,000	31·7	6 4-in. 4 M.	4	190	427 / 80
Almirante Riveros (ex-Faulknor) Almirante Uribe (ex-Broke) Almirante Williams (ex-Botha)	White	1914	320 p.p.	32·6	11	3	1700 to 1740	30,000	31·5	2 4·7-in., 2 4-in., 2 2-pdr. A.A.	4	174	403 / 83
SUBMARINES—													
Capitan Thompson Capitan Simpson Capitan O'Brien	Vickers Armstrong's	1929 1929 1928	275	27·5	14·8	..	1520 / 1990	..	15 / 9	1 4-in.	8	..	..
H 1 H 2 H 3 H 4 H 5 H 6	Fore River, U.S.A.	1915	150·3	15·75	12·3	..	355 / 470	480 / 640	13 / 11	..	4	22	— / 17·5

3 submarines are projected (no money voted).

Denmark.

Name or Number.	Where built.	Launched.	Dimensions. Length (Extreme).	Beam.	Draught.	Number of Screws.	Displacement.	Horse Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO BOATS. FIRST CLASS—													
Laxen Dragen Hvalen	Royal Dockyard, Copenhagen	1930 1929 1930	198·9	19·5	7·4	2	315	6,000	28	2 3-in.	8	—	— / 26
R4. Havkatten † R5. Sælen † R3. Nordkaperen † R2. Makrelen † S6. Narhvalen * S5. Havhesten * S4. Söhunden * S3. Sölöven * S2. Stören *	Royal Dockyard, Copenhagen	1919 1919 1918 1918 1917 1917 1917 1916 1916	126·3	13·9	9	2	108·5	2,000	24·6 *t.*	2 6-pr. A.A.	2	22	15 / —
R1. Ormen †		1907	124·6	14	8·5	1	105	2,100	26	2 3-pr.	3	21	11 / —
P3. Sværdfisken P2. Delfinen P1. Hvalrossen		1913 1913 1913	148·2	16·9	7·5	2	190	3,480	26·2 *t.*	1 3-in.	4	30	28 / —
O3. Söülven O2. Flyvefisken O1. Söridderen	Burmeister, Copenhagen Yarrow & Co.	1911 1911 1911	181·7	18	9·7	2	275	5,000	27·5	2 3-in.	5	33	80 / —
N3. Spaekhuggeren N2. Vindhunden N1. Tumleren	Royal Dock., Copenhagen Schichau	1911	184·8	19·1	7·1	2	300	5,000	27·5	2 3-in.	5	34	80 / —
SUBMARINES—													
Daphne. D1 Dryaden. D2	Royal Dockyard, Copenhagen	1926	161	16	8·2	..	305 / 370	900 / 400	13·4 / 7	1 3-in. A.A.	6	18	— / 16
Flora. C3 Bellona. C2	,,	1919	155·7	14·4	3·8	..	301 / 369	900 / 640	14·5 / 10·5	1 6-pr.	5	17	— / 13
Rota. C1	,,	..											
B12. Galathea Neptun. B11 Triton. B10 Ran. B9 Aegir. B8	,, ,, ,, ,, ,,	.. .. 1914 1915 1914	133·3	12·3	8	..	181 / 231	450 / 340	13·5 / 9·8	1 6-pr.	3	12	— / 9
Nymfen. A7 Najaden. A6 Havfruen. A2	,, ,, Whitehead & Co., Fiume	1914 1913 1912	127·2	12	7·6	..	161 / 201	450 / 275	13·0 / 9·3	..	2	12	— / 8

* Used as minesweepers. † Guard ships.

France.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
FLOTILLA LEADERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Da 16 .. .. / Da 17	Lorient	Bldg.	..	..	..	..	2,568	..	..	..	..	..	..
Da 10 Vauquelin	Ch. de France Dunkirk												
Da 11 Kersaint	Ch de la Loire, Nantes												
Da 12 Cassard	Ch. de Bretagne, Nantes												
Da 13 Partu	Ch. de la Loire, Nantes	Bldg.	424	38½	14·8	2	2,440	64,000	37	5 5·5-in, 1 3-in. A.A., 4 1-pr. A.A.	6	220	..
Da 14 Brézé	Ch. de Penhoet, St. Nazaire												
Da 15 Le Chevalier-Paul	Ch. de la Mediterranée, Havre												
D 4 Aigle	Ch. de France, Dunkirk												
D 5 Vautour	Ch. de la Mediterranée, Havre												
D 6 Albatross	Ch. de la Loire, St. Nazaire	1930	433	37	14·8	2	2,440	64,000	36	5 5·5-in., 1 3-in. A.A., 4 1-pr. A.A.	6	220	..
D 7 Gerfaut	Ch. de Bretagne, Nantes												
D 8 Milan .. .. / D 9 Epervier	Lorient	..	..	..	..	..	..	..	..	..	7		
Valmy	Ch. de Penhoet, St. Nazaire	1928											
Verdun	Ch. de la Loire, St. Nazaire	1928	427	38	15	2	2,436	70,000	39·9 t 40·1 t 36	5 5·5-in. 4 37 mm A.A.	6	216	— / 650
Vauban	Ch. de France Dunkirk	1930											
Lion	Dunkirk ..	1929											
Bison	Lorient ..	1928	427	38	15	2	2,436	70,000	35·5	5 5·5 in., 4 1·5 in. A.A.	6	216	— / 650
Guépard	Lorient ..	1928											
Chacal	St. Nazaire ..	1924											
Jaguar	Lorient Dy.	1923											
Leopard	St. Nazaire ..	1924											
Lynx	,,	1925	416	36	14·8	2	2,126	50,000	35·5	5 5·1-in., 2 3-in. A.A.	6	206	— / 530
Panthère	Lorient Dy.	1924											
Tigre	Nantes ..	1924											
Amiral Sénès, *ex*-S. 113	Germany ..	1917	346·5	33·5	14·8	2	1,525	56,000 t	36·9 t	4 5·9-in., 4 M	2 dbl.	180	— / 700
DESTROYERS—													
Forbin	Ch. de Graville, Le Havre	1928											
Frondeur	Ch. Navals Français, Caen	1929											
Fougueux	Ch. de Bretagne, Nantes	1928											
Foudroyant	Ch. de Dyle et Bacalon, Bordeaux	1929											
Basque	Maritime ..	1929	351·7	32·2	10·2	..	1,378	35,000	34	4 5·1-in., 2 1-pr. A.A.	6	146	— / 300
Bordelais	Bordeaux ..	1928											
Boulonnais	Caen	1927											
Brestois	Nantes ..	1927											
L'Adroit	Dunkirk ..	1927											
L'Alcyon	Bordeaux ..												
Le Fortune	Caen												
Le Mars	Caen	1926											
La Palme	Nantes ..												
La Railleuse	Nantes ..												
Bourrasque	Dunkerque	1925											
Cyclone .. .. / Mistral	Havre ..	1925											
Orage .. .. / Ouragon	Caen	1924											
Simoun	St. Nazaire ..	1924	346¼	31·7	10·2	2	1,319	33,000	33	4 5·1-in., 1 3-in. A.A., 2 1·7-in. torpedo tubes.	6	140	— / 350
Sirocco	Rouen												
Tempête	Nantes ..	1925											
Tramontane	Bordeaux ..												
Trombe	Harfleur ..	1924											
Typhon	Bordeaux ..	1925											
Tornade	Barcelona ..	1925											
Glaive	Rochefort ..	1908	197·4	22·4	11·8	2	310	6,800	27·90	1 9-pr. 4 3-prs.	1	70	85 / —
Trident	Rochefort ..	1907		21·5	11·3	2		6,800	28	1 9-pr., 4 3-pr.	1	70	85 / —
*Com. Rivière, *Dehorter	Normand, &c.	1912	250	25·4	10·0	3	700	10,000	31	2 3·9-in., 4 9-prs.	4	84	— / 140
*Bisson .. .. / *Protet, *Comm. Lucas, / *Mangini	Toulon, etc.	1912 & 1913	257·5	25·5	10·0	3	787–817	16,000	31	2 3·9-in., 4 9-prs.	2 dbl.	84	

* Fitted as mine-sweeper.

4 additional flotilla leaders, Da 18–Da 21, of 2,568 tons displacement, are authorised.

France—*continued*.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal/Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
DESTROYERS—*Contd.*													
Ens. Roux, M. P. Lestin	Rochefort ..	1915	271	27	10·5	2	787	18,000	30	2 3·9-in., 1 3-in., 4 9 pr.	2 dbl.	98	—/206
Ens. Gabolde	Havre	1921	271	26·9	10·0	2	802	22,000	33	3 3·9-in.	4	98	—/200
Rageot-de-la Zouch, *ex*-H. 146 .. .. ; Delage, *ex*-H. 147 ..	Germany ..	1917	266	27·4	10·0	2	787	23,800	33·3 *t*	3 4-in., 1 1-pr., 4 M., 40 mines.	6	111	—/295
Buino, *ex*-V. 30	Germany ..	1917	269	27·2	10·0	2	802	20,150	30·5	3 4·1-in., 2 M.	6	113	—/295
Pierre Durand, *ex*-V. 70	Germany ..	1915											
Deligny, *ex*-S. 139 .. ; Chastang, *ex*-S. 133 .. ; Vesco, *ex*-S. 134 .. ; Mazare, *ex*-S. 135 ..	Germany ..	1917	272·3	27·3	11·5	2	767	16,800	28	3 4·1-in., 4 M.	6	113	—/246
Matelot Leblanc, *ex*-Dukla	Fiume ..	1916	277·5	25·7	11·0	2	748	17,000	32·5	2 3·9-in., 6 smaller.	4	120	108/152
Téméraire, Intrépide, Opiniâtre, Aventurier	Nantes ..	1911	290·5	28·5	11·5	..	915	24,000	27	4 3·9-in. 1 3-pr. A.A.	4	102	236/74
Annamite, Algérien, Arabe, Bambara, Hova, Kabyle, Marocain, Sakalave, Sénégalais, Somali, Tonkinois, Touareg ..	Japan	1917	272	24	10·5	..	601	11,000	29	1 4·7-in., 4 3-in.	2 dbl.	106	98/115
Bouclier	..	1912	237	24·7	9	..	629	14,000	35	2 3·9-in. 4 9-pr. 1 3-in A.A.	4	..	..

Seven 1st class torpedo boats (1905–7), 98 tons, 14-17 knots.

Name or Number.	Where Built.	Launched.	Length.	Beam.	Draught.	Number of Screws.	Displacement. Surf./Sub.	Horse-Power. Surf./Sub.	Speed. Surf./Sub.	Armament.	Torpedo Tubes.	Complement.	Fuel.
CRUISER SUBMARINES—													
Surcouf..	Cherbourg ..	1929	393·7	29·5	23	2	2880/4300	7600	18/11	2 8-in.	14	130	..
SUBMARINES, 1st Cl.													
Q 178	Cherbourg ..	Bldg.	..	..	..	..	1380	..	..	..	..	..	..
Q 179	Lorient ..												
Q 180	Brest ..												
Q 181	Brest ..												
Q 182	Contract ..												
Q 183	Contract ..												
Q 184*	..	..	..	..	..	..	571	..	..	..	..	..	..
Glorieux	Cherbourg	Bldg.	302	26·8	15·5	2	1380/1970	6000/—	17/—	1 5·5-in. 1 1·5-in. A.A.	11	..	..
Centaure	Cherbourg												
Héros	Brest ..												
Conquerant..	Brest ..												
Tonnant	Loire ..												
Espoire	la Seine												
Promethée	Cherbourg ..	1930	301·8	26·8	15·5	..	1380/1970	6000/2000	18/10	1 3·9-in., 1 1·5-in. A.A.	11	..	..
Persée	Ch. Navals Français, Caen												
Protée	Forge et Ch. de la Mediterranée la Seyne												
Pégase	Ch. de la Loire, St. Nazaire												
Phénix	Ch. Dubigeon, Nantes												
Achille	Brest	1929–1930	301·8	26·8	15·5	..	1380/1968	6000/2000	18/10	1 3·9-in, 1 1·5-in. A.A.	11	..	—/96
Ajax	Brest												
Acheron	Ch. de la Loire, St. Nazaire												
Argo	Ch. Dubigeon, Nantes												
Acteon	Ch. Dubigeon, Nantes												
Pascal	Brest	1928	302·5	26·8	15·5	..	1380/1968	6000/2000	18/10	1 3·9-in. 1 1·5-in. A.A.	11	..	—/96
Pasteur	Brest	1928											
Poncelet	Lorient ..	1929											
Henri Poincare ..	Lorient ..	1929											
Archimede	Caen	1929											
Fresnel..	Ch. de Penhoet, St. Nazaire	1929											
Monge	Ch. de la Mediterranée, la Seyne	1929											
*Rubis..	Toulon	1930	216·5	23·3	13·5	2	689/910	1300/1000	12/9	1 3-in., 64 mines	6	..	..
*Diamant	Toulon	Bldg.											
*Nautilus	Toulon	1928											
*Saphir	Toulon	1929											
*Turquoise	Toulon	1929											
Redoubtable ..	Cherbourg ..	1928	302·5	30·5	15·5	2	1384/1968	6000/2000	18/10	1 3·9-in. A.A. 1 1-pr. A.A. 1 seaplane in Redoubtable	11	..	—/96
Vengeur	Cherbourg ..												
Requin..	Cherbourg ..	1924	278·8	22·5	15	2	974/1415	2900/1800	16/10	1 3·9-in. A.A.	10	54	..
Morse	Cherbourg ..	1925											
Narval	Cherbourg ..	1925											
Souffleur	Cherbourg ..	1924											
Caiman	Cherbourg ..	1927											
Dauphin	Toulon ..	1925											
Espadon	Toulon ..	1926											
Marsouin	Brest	1924											
Phoque..	Brest	1926											

France—*continued.*

Number and Name.	Where Built.	Launched.	Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surf./Sub.	Horse-Power.	Maximum Trial Speed. Surf./Sub.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal/Oil
SUBMARINES—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Q 185, Q 186, Q 187, Q 188	..	Bldg.	..	..	..	..	570	..	..	..	..	..	..
Orphée, Oréade, Orion, Ondine	Ch. Normand, Havre	Bldg.											
Psyche, Sybille	Ch. Normand, Worms	Bldg.	..	..	..	..	570/790	1300/—	13·7/—	1 3-in., A.A.	8	..	..
Vestale, Sultane	Schneider	Bldg.											
Amphitrite	Ch. de la Seine Maritime, Le Trait	Bldg.											
Antiope	Chantiers Normand, Havre	Bldg.											
Atalante	Schneider et Cie Chalons-sur-Saone	1930											
Amazone	Ch. de la Seine Maritime, Le Trait	Bldg.	216¼	16·2	12·7	2	565/790	1300/—	14/9·2	1 3-in. A.A.	8	..	..
Diane, Meduse	Chantiers Normand, Havre	1930, 1930											
Argonaute, Arethuse	Schneider et Cie Chalons-sur-Saone	1929, 1929											
Ariane, Danaé, Eurydice	Havre	1925, 1927, 1927	216·5	16	12·8	2	565-766	1200-1000	14/9	1 3·9-in. A.A.	7	40	..
Circé, Calypso, Doris, Thetis	Chalons	1925, 1926, 1927, 1927	204·5	17·5	12·8	2	552-765	1250-1000	14/9	1 3·9-in. A.A.	7	40	..
Naïde, Sirène, Nymphe, Galatée	St. Nazaire	1925, 1925, 1926, 1925	210	17	12·8	2	548–744	1300-1000	14/9	1 3·9-in. A.A.	7	39	..
Amphitrite	Rochefort	1914	177	17·7	10·9	2	384–597	1300-700	14/7·8	1 3-in.	8	30	—/13
Atalante	Toulon	1913											
‡Néréide	Cherbourg	1914	243	19·8	12·3	2	840–1070	2900-1500	14/12	1 3-in.	8	40	—/56
Bellone, Hermione, Gorgone	Rochefort, Toulon	1914 & 1915	198·9	17·7	11·9	2	484–783	1800-800	15·5/10	1-3-in.	8	40	—/14
‡Gustave Zédé	Cherbourg	1913	243	19·7	12·3	..	840–1080	2400-1500	16/10	1 3-in.	8	47	—/68
‡Daphne	Cherbourg	1915	223	18·0	12·0	2	703–882	1800-1500	15/11	1 3-in.	10	43	—/58
‡Joessel, Fulton	Cherbourg	1917	243	20·0	13·4	2	915–1200	2900-1650	16½/11	2 3-in.	8	47	—/118
‡Laplace, ‡Lagrange, ‡Romazzotti, Regnault	Rochefort, Toulon, Toulon	1917, 1917, 1918	246	21·0	13·0	2	925–1307	2600-1640	17/11	2 3-in.	8	47	—/90
Armide	Schneider	1915	184·6	17·0	10	2	420–665	2200-900	17·4/10	..	6	29	—/27
O'Byrne, Henry Fournier,	Chalons	1919	172	15·6	9·6	..	315–502	1020-460	14/8	1 3-pr.	4	24	—/10
‡Dupuy de Lôme, Sané	Chalons	1916, 1915	246	20·9	13·7	..	837-1270	2400-1660	18/11	2 3-in.	8	40	—/99
‡*Pierre Chailley	Havre	1922	229·7	24·7	13 0	..	798–1181	1800-1400	13·5/9	1 3·9-in., 2 M 40 mines	4	43	—/54
‡*Maurice Callot	Bordeaux	1921	247·8	22	11·8	..	843–1270	2900-1640	16½/10	1 3-in., 40 mines	6	48	—/44
‡Pierre Marrast (ex-U. 162), ‡Jean Roulier (ex-U. 166)	,,	1918	235	21	12·7	2	860-1030	2400-1200	16/8·5	1 4-in., 1 M.	6	48	—/98
‡Halbronn (ex-U. 139)	,,	1918	302·2	30	15·5	2	2030-2516	3300-1780	13·6/7·7	2 5·9-in.	6	80	—/443
‡Jean Antric (ex-U. 105), ‡Leon Mignot (ex-U. 108)	,,	1917	234·5	21	12·5	..	835–1038	2400-1200	16·5/8·5	1 4·1-in., 1 M.	6	48	—/81
Jean Corre (ex-U.B. 155), Carissan (ex-U.B. 99), Trinité Schillemans (ex-U.B. 94)	,,	1917, 1918	182·5	19	12	..	464–640	1100-760	12/7·5	1 4·1-in., 1 M.	5	34	—/74
‡*René Audry (ex-U. 119)	,,	1917	267·5	24	14	..	1041-1525	2400-1200	14·5/7·2	1 5·9-in., 1 M 42 mines	4	54	—/213
‡*Victor Réveille (ex-U. 79)	,,	1916	193	19·5	16	..	681–877	1300-800	10/8	1 4·1-in., 1 M. 36 mines	2	40	—/64

French submarines are divided into two classes:—1st class: All vessels of 850 tons and above in the surface condition, including the U minelayers. 2nd class: All smaller vessels. All vessels on page 350 are 1st class, and vessels on this page marked ‡. Other vessels on this page are 2nd class. * Mine-laying submarines.

Germany.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet		Tons.		Knots.				Tons.
DESTROYERS—													
Iltis Wolf Tiger Luchs Jaguar Leopard	Wilhelms-haven	1927 1927 1928	304	28¼	8¾	..	800	23,000	34	3 4·1-in.	6	..	..
Seeadler Greif Albatross Kondor Falke Möwe	Wilhelms-haven	1926 1926 1926 1926 1926 1926	287¾	27¼	10	..	800	23,000	33	3 4·1-in.	6	115	— / 300
G. 11 G. 10 G. 8 G. 7	Germania Works, Kiel	1911–1912	233	25	10	..	650	16,000	32·5	2 4·1-in., 7 M.	2	90	140 / 60
*S. 23	Shichau Elbing	1913	234·6	24·6	10	..	630	15,700	32	2 4·1-in., 7 M.	2	90	132 / 55
*T. 196	Kiel	1911											
*T. 190	Vulcan Works, Stettin	1910	243	26	10·5	..	787	18,000	32·5	2 4·1-in., 2 M.	2	98	160 / 54
*T. 185													
*T. 151, 152, 155-8	..	1907-8	237	25½	10·1	..	664	10,900	30	2 3·9-in.	2	97	— / 172

* Torpedo boats.

Four destroyers are projected; construction to commence in 1934.

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Miaulis Canaris Tombasis Pablo Conduriotis	Odero, Genoa	Bldg.	310	30·0	11·0	..	1334	..	40	4 4·7 in., 4 2-pr. A.A.	2 triple		
Thyella Sphendoni Lonchi	Yarrow	1906	220	20·6	9·0	2	350	6000	31·79 31·84 32·53	2 3-in., 4 6-pr.	2	70	80 / —
Niki Aspis Velos	Stettin (Vulcan)	1906	220	20·6	9·0	2	350	6000	30	2 3-in., 4 6-pr., 2 6-pr. A.A.	2	70	80 / —
†Aetos, †Leon, †Panther, †Ierax	Birkenhead	1911	293	27·7	9·6	..	980	19,750	32	4 4-in., 1 3-in. A.A.	6	110	— / 260
SUBMARINES—							Surf. / Sub.		Surf. / Sub.				
Katsonis Papanicolis	Schneiders, Harfleur Ch. de la Loire, Nantes	1926	203¾	17·7	12·3	..	593 / 760	1300 / 1000	14 / 9·5	1 4-in., 1 2-pr. A.A.	6	30	..
Nereus Proteus Triton Glaucos	Ch. de la Loire, Nantes Ch. de France, Caen	1927 1927 1928 1928	223¾	18¾	12·6	2	718 / 945	1970 / 1200	14 / 9·5	1 4-in., 1 2-pr. A.A.	8	45	..

Six 125-ton torpedo-boats built by the Vulcan Co. at Stettin: Arethusa, Doris, Aigli, Dafni, Alkyonis, Thetis, 25 knots.
The surrendered Austrian torpedo-boats: Pergamos, Kios, Proussa, Kyzikos and Kydonia, 250 tons, have been added to the Greek Navy for police duties.
Two coastal motorboats are building at Ernesto Breda, Venice, 35 tons displacement.
Four destroyers are projected.

† Reconstructed by Messrs. J. S. White & Co., Cowes, 1924–25.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Standard Displacement. (Wash. Treaty.)	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal. / Oil.
			Feet.	Feet.	Feet.		Tons		Knots				Tons.
FLOTILLA LEADERS—													
U. Vivaldi .. A. Usodimare .. L. Tarigo .. L. Malocello .. L. Pancaldo .. A. Da Noli .. E. Pessagno .. N. Da Recco .. N. Zeno .. G. Da Verazzano .. A. Cadamosto .. A. Pigafetta ..	Genoa (Odero) Genoa (Ansaldo) Riva Trigoso (Cant. Navali) Ancona (Cant. Navali) Fiume ..	1929 1929 1928 1929 1929 1929 1929 1929 1928 1928 1929 1929	351 p.p. ..	33·3 ..	17 ..	.. ..	1630 ..	50,000 ..	38 41·5 *t.*	6 4·7-in. 6 2-pr. (L. Malocello has 4 1·5-in.)	6 21-in. ..	200 ..	— / 500 ..
Leone* .. Pantera* .. Tigere* ..	Ansaldo ..	1923 1924 1924	359·3 p.p.	34·3	11·5	..	1525	42,000	34	8 4·7-in. twins, 2 3-in. A.A., 60 mines.	2 triple	210	— / 350
Aquila* ..	Pattison ..	1916	310	31	10·8	..	1407	40,000	35	4 4·7-in. twins, 2 3-in. A.A., 50 mines	2 dbl. 18-in.	140	— / 260
Falco* ..	Pattison ..	1916	310	31	10·8	..	1407	40,000	35	5 4·7 in. (2 twins and 1 single), 4 3-in. A.A., 50 mines.	2 dbl. 18-in.	140	— / 260
Premuda* (*ex*-German V116)	.. .. ..	1918	347·8	34	14·2	..	2165	54,000	33	4 5·9 in., 2 2-pr A.A.	2 dbl. 19·7in.	..	— / 720
Augusto Riboty* .. Carlo Mirabello* ..	Ansaldo ..	1915 1914	331·3 p.p.	32·2	9·8	..	1285 1382	35,000	35	8 4-in., 4 2-pr. A.A., 100 mines.	2 dbl. 18-in.	150	— / 344
Cesare Rossarol,* *ex*-German B97 ..	Hamburg	1915	321½	30·6	9·5	2	744	40,000	36	4 4·7-in., 2 3-in. A.A. 24 mines	4	..	— / 526
DESTROYERS—													
Maestrale .. Grecale .. Lebeccio .. Sciracco ..	..	Bldg.	..	..	..	..	1400	..	..	..	..	..	..
Dardo .. Strale .. Freccia .. Saetta ..	Odero, Sestri Pozente Cant. Navale di Tirreno, Sestri Levante	1930	311	30	11	..	1206	44,000	38	4 4·7-in.	6 21-in.	..	..
Folgore .. Lampo .. Baleno .. Fulmine ..	Cantieri Partenopei, Naples Quarnaro Yard, Fiume	1931	309	30·5	11	..	1220	44,000	38	4 4·7 in. 3 M.	6	..	..
Borea .. Zeffiro .. Espiro .. Ostro .. Aquilone .. Turbine .. Nembo .. Euro ..	Ansaldo, Genoa Odero, Genoa Genoa Docks Co.	1927 1927 1927 1928 1927 1927 1927 1927	311½	30·2	10·6	2	1092	35,000	36	4 4·7-in., 3 2-pr. A.A. 3 M., 52 mines	6	140	— / 340
N. Sauro .. C. Battisti .. F. Nullo .. D. Manin ..	Odero Quanaro, Fiume	1926 1926 1925 1925	295½	30·2	10·5	..	1060	32,000	35	4 4·7-in., 3 2-pr. A.A. 3 M., 52 mines	6	140	— / 340
Francesco Crispi .. Giovanni Nicotera Bettino Ricasoli .. Quintino Sella	Naples (Pattison)	1925 1926 1926 1925	278·6	28·2	10	2	935	28,000	35	3 4·7-in., 2 2-pr. A.A. 2 M., 40 mines	2 dbl. 21-in.	106	— / 200
Alessandro Poerio .. Gulielmo Pepe ..	Genoa (Ansaldo)	1914	279	26·3	9·3	2	844	20,000	32	5 4-in., 2 2-pr. A.A.	2 dbl.	100	— / 250
Impavido .. Indomito .. Insidioso .. Irriquieto ..	Naples (Pattison)	1913 1912 1913 1913	239½	24·0	8·4	2	540	13,500	30	5 4-in., 2 2-pr. A.A. 1 M., 10 mines	2	71	— / 110
Ardito .. Ardente ..	Orlando (Leghorn)	1912	239½	24·0	8·4	2	560	13,800	30	5 4-in., 2 2-pr. A.A 10 mines	2	71	— / 110
Giuseppe Sirtori .. Vicenzo Orsini .. Francesco Stocco .. Giovanni Acerbi ..	Genoa (Odero)	1916 1917 1916 1916	237¼	24	9·0	2	670	15,000	30	6 4-in., 4 2-pr. A.A. 2 M.	4	100	— / 150
E. Cosenz .. Giacomo Medici .. G. La Farina .. Nicola Fabrizi .. Angelo Bassini .. Giacinto Carini .. G. La Masa ..	Genoa (Odero)	1918 1917 1918 1917 1917 1917 1917	237¼	24	9·0	2	635	15,000	30	4 4-in., 2 3-in., 2 M. Carries 10 mines.	4	100	— / 150
Fratelli Cairoli .. Antonio Mosto .. Rosolino Pilo .. Giuseppe Abba .. Ippolito Nievo ..	Naples (Pattison) Genoa (Odero)	1914	236	24	8·8	2	615	13,500	30·8 30	5 4-in., 4 2-pr. A.A. 2 M.	4	71	— / 150

* Designated scouts in Italian official list of naval vessels.

Italy—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Standard Displacement. (Wash. Treaty.)	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal/Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—*contd.*													
Simone Schiaffino ..	Genoa (Odero)	1914	236	24	8·8	2	615	13,500	30	5 4-in., 4 2-pr. A.A. 2 M.	4	71	—/150
Giuseppe Dezza ..		1914											
Giuseppe Missori ..		1915											
Gen. A. Cantore ..		1921 1922	240⅓	24	9·0	2	635	18,000	30	3 4-in., 2 3-in. A.A.	4	100	—/150
Gen. A. Chinotto ..													
Gen. A. Papa ..													
Gen. A. Cascino ..													
Gen. M. Prestinari													
Gen. C. Montanari													
Audace	Yarrow ..	1918	287	27·5	8·3	2	630	21,500	30	7 4-in., 1 2-pr. A.A.. 2 M.	2 dbl.	111	—/252
Ardimentoso, *ex*-S. 63	Schichau ..	1915	274	27·3	8·6	2	803	23,000	33	3 3·9-in., 2 3-in., 24 mines	4	98	—/305
Solferino, Palestro S. Martino, Curtatone Confienza, Castelfidardo, Calatafimi, Monzambano ..	Leghorn (Orlando)	1921 1922 1923	269 283½	26·5	8·6	2	860 966	18,000	33·5	4 4-in., 2 3-in. A.A., 2 M., 24 mines	4 6	..	—/170
Cortellazzo	Danubius *ex*-Austrian	1917	274	25·5	8·2	2	570	17,000	32·5	2 3·9-in. 4 3-in. 2 3-in. A.A 2 M.	4	102	—/95
Grado													
Monfalcone													
Pola		1913											
FIRST CLASS TORPEDO BOATS—													
P.N., 7, 9, 12, 33, 34, 35, 38, 41, 43, 45, 64, 65, 67, 69–71	Pattison ..	1912 & 1913	139·5	15	5·5	2	116 133	2,700–3,500	28–29	2 3-in. A.A. 1 smaller	2	..	—/15
A.S., 29, 52-57 ..	Ansaldo ..												
O.S., 49-51	Odero	1914											
O.L., 58-63	Orlando ..	1916 1920	139·5	15	5·5	2	133 168	2,700–3,800	27	2 3-in. A.A. 1 smaller	2	..	—/25
O.L.T., 74, 75 ..	Orlando ..												
SUBMARINES—													
4 ("Ballila" class)	..	Bldg.	..	..	..	..	1300	..	..	..	..	..	..
6	..		..	..	..	..	810	..	..	..	..	..	..
12 *	..		..	..	..	..	610	..	..	..	..	..	..
Squalo	Cantiere Navale, Triestino	1930	212	18·8	15·5	..	810/1077	3,000/1,400	16·5/9	1 3·9-in.	6	64	..
Narvalo													
Delfino													
Tricheco													
Argonauta	Cantiere Navale, Triestino Odero-Terni, Spezia Tosi, Taranto	Bldg.	200	18·8	13	..	599/778	1,200/800	14/9	1 3·9-in.	6	..	..
Fisalia													
Medusa													
Jalea..													
Jantina													
Serpente (*ex*-Nautilus)													
Salpa..													
Santorre Santarosa	Ansaldo ..	1929	230	19	15·5	..	797/1134	3,000/1,400	17·5/9	1 4-in.	8	..	..
Ciro Menotti													
Fratelli Bandiera ..	Monfalcone	1929											
Luciano Manara ..													
Luigi Settembrini ..	Taranto ..	1930											
Ruggiero Settimo ..													
E. Fieramosca ..	Taranto (Tosi)	1930	277	27	16·8	..	1300/1707	6,000/2,000	19/10	1 3·9-in., carries mines	10	..	—/80
M. Bragadino ..	Taranto (Tosi)	1929	233	18·6	14	2	802/1021	1,500/1,000	14/8	1 4-in., 24 mines	4	..	—/41
F. Corridoni		1930											
Ballila	Spezia, Ansaldo	1927	285	25·6	14	..	1300/1854	4,800/2,200	18·5/10	1 4·7-in., 1 smaller	6 21-in.	..	—/140
A. Sciesa..		1928											
E. Toti		1928											
D. Millelire		1927											
V. Pisani..	Montfalcone, Trieste	1927	223	18·7	13·8	..	768/1034	3000/1000	17·5/9	1 4-in. 1 M.	6 21-in.	..	—/48
M. Colonna		1927											
Da. Geneys		1928											
G. Bausan		1928											
G. Mameli	Taranto ..	1926	213·3	21·5	13	..	770/977	3000/1000	17·5/9	1 4-in.	6 21-in.	..	—/48
P. Capponi		1927											
Speri		1928											
G. Da. Procida ..		1928											
L. Mocenigo	Venice.. ..	1918	211·7	20·3	15·6	..	780/1224	2,600/1,300	17/10	2 3-in., 1 M.	6 18-in.	32	—/50
A. Emo		1919											
G. Nani	Spezia, F.I.A.T.	1917	218·0	19·3	14	..	708/909	2600/1300	17/10	2 3-in., 1 M.	6 18-in.	32	—/60
X 2, 3	Ansaldo ..	1916	139·9	18	11	..	390/460	650/320	10/6·3	1 3 in. A.A. 1 M., 18 mines	2 18-in.	..	—/8
H 2, 4, 6, 8	Vickers ..	1917	150·3	15·8	12	..	336/466	500/620	12/8·9	1 3-in. A.A. 1 M.	4 18-in.	22	—/18
F 13, 20	F.I.A.T. .. Odero and Orlando ..	1916	149·6	13·8	10	..	242/313	700/250	12·5/8	1 3-in. A.A.	2 17·7 in.	22	—/12
N 3, N 4	Ansaldo ..	1916	150·5	14	9·9	..	262/357	650/320	12·5/7·5	1 3-in. A.A. 1 M.	2 18-in.		—/9
N 6	Taranto ..	1917											

Japan.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS :													
FIRST CLASS—													
4 in number	Sasebo	Bldg.	..	..	..	..	1375	..	..	..	..	..	..
Oboro	Sasebo												
Akebono	Fujinagata												
Sazanami	Maizuru												
Ushio	Uraga	1929–											
Akatsuki	Sasebo	1930											
Hibiki	Maizuru												
Ikazuchi	Uraga												
Inazuma	Fujinagata												
Sagiri	Uraga	1929											
Asagiri	Sasebo	1929											
Yugiri	Maizuru	1930											
Amagiri	Tokyo	1930											
Shikinami	Maizuru	1929	368 p.p.	34	10·7	..	1700	40,000	34	6 5-in., 2 M.	9 21-in.	210	..
Ayanami	Fujinagata	1929											
Fubuki	Maizuru	1927											
Shirayuki	Yokosuka	1928											
Hatsuyuki	Maizuru	1928											
Miyuki	Uraga	1928											
Murakumo	Fujinagata	1928											
Shinonome	Sasebo	—											
Usugumo	Ishikawa-jima (Tokyo)	1927 1927											
Shirakumo	Fujinagata	1927											
Isonami	Uraga	1927											
Uranami	Sasebo	1928											
Minadzuki	Uraga	1926											
Fumitsuki	Fujinagata	1926											
Nagatsuki	Ishikawajima	1926											
Kikudzuki	Maizuru	1926	320 p.p.	30	9·8	2	1315	38,500	34	4 4·7-in., 2 M.	6 21-in.	148	— / 400
Mikadzuki	Sasebo	1926											
Mochidzuki	Uraga	1927											
Yudzuki	Fujinagata	1927											
Oite, Yayoi	Uraga	1924, 25											
Hayate, Udzuki	Ishikawa-jima	1925											
Yunagi, Mutsuki	Sasebo	1924, 25	320 p.p.	30	9·7	..	1315	38,500	34	4 4·7-in., 2 M. A.A.	6 21-in.	148	— / 400
Kisaragi	Maizura	1925											
Satsuki	Fujinagata	1925											
Kamikaze, Asakaze	Nagasaki	1922											
Harukaze, Matsukaze, Hatakaze	Maidzura	1922–24	320 p.p.	30	9·6	..	1270	38,500	34	4 4·7-in., 2 M. A.A.	6 21-in.	..	— / 400
Asanagi	Fujinagata	1924											
Amatsukaze	Kobe												
Tokitsukaze	Kure	1916	325·5	28·0	9·3	3	1105	27,000	34	4 4·7-in., 2 M.	6 18-in.	145	145 / 295
Isokaze	Kure												
Hamakaze	Nagasaki												
Tanikase	Maizuru		336·5	29	9·3	2	1180	34,000	34	3 4·7-in., 2 M.	6 21-in.	128	— / 380
Kawakase	Yokosuka												
Sawakase	Nagasaki	1916–19											
Okikase, Shimakase, Nadakase, Yukase, Hakase, Minekase	Maidzuru												
Namikase, Numakase, Nokase, Tashikase, Shiokase, Hokase, Yakase, Akikase	Mitsubishi, Kawasaki, Maidzuru	1920–22	336·5	29·25	9·5	2	1215	38,500	34	4 4·7-in. 2 M. A.A.	6 21-in.	149	— / 400
Urakase	Yarrow	1915	287·3	27·6	9·5	—	810	22,000	28	1 4·7-in., 4 3-in.	4 21-in.	—	—
SECOND CLASS—													
Wakatake, Kuretake	Kawasaki, Kobe	1922											
Fuyo, Karukaya	Fujinagata	1922, 23	275 p.p.	26·5	8·3	..	820	21,500	31·5	3 4·7-in., 2 M. A.A.	4 21-in.	110	— / 250
Asagao, Yugao	Ishikawa-jima	1922–23											
Sanaye, Sawarabi	Uraga	1923											
Momo, Yanagi	Sasebo						755	16,000					
Kashi, Hinoki	Maidzuru												
Kuwa, Tsubaki	Kure	1916–18	275·0 p.p.	25·3	7·9	2			31·5	3 4·7 in., 2 M.	6 18-in.	109	92 / 212
Maki, Keyaki	Sasebo						770	17,500					
Momi, Kaya	Yokosuka												
Nashi, Kaki, Take	Kawasaki												
Kuri	Kure	1917–19	275·5 p.p.	26	8	2	770	21,000	31·5	3 4·7 in., 2 M.	4 21-in.	110	— / 290
Nire, Tsuga	Ishikawa-jima												

Six 3rd class destroyers of 375 tons, 6,000 shaft h.p., and 30 knots, carrying 5 3-in. and 2 T.T., fitted as minesweepers.
15–17 destroyers projected for completion before 1936.

Japan—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length (extreme).	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes	Complement	Fuel Coal/Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—*contd.* *Second class*—contd.													
Hagi .. .. Susuki, Yomogi Sumire .. .. Hishi, Hasu .. Tade, Fuji .. Aoi, Kiku .. Tsuta, Ashi, ..	Uraga .. .. Ishikawa-jima Uraga, Fujinagata, Kawasaki	1920-1922	275·5 p.p.	26	8	2	770	21,000	31·5	3 4·7 in. 2 M., A.A.	4 21-in.	80	—/290
		Com-pleted					Surf./Sub						
SUBMARINES—													
I5	Kawasaki ..	Bldg.	..	..	..	..	1955	..	..	..	..	..	..
I65 .. I66 .. I67 ..	Kure	1931	321	25·6	15·9	..	1638/—	6000/1800	19/9	1 4-in.	8	..	..
I59 .. I61 .. I62 .. I64 .. I57 ..	Yokosuka .. Mitsubishi .. Kobe .. .. Kure .. .. Kure	1929 1929 1928 1929 1929	320½ p.p.	26	16	..	1650/2100	6000/1800	21/7·9	1 4·7 in.	8	56	—/255
I4 .. .. I1, I2, I3 ..	Kawasaki .. Kawasaki ..	1929 1926	320 p.p.	30·2	15·7	..	1970/2480	6800/1800	17/9	2 4·7 in. 1 M.	6	61	—/520
†I21 .. †I22 .. †I23 .. †I24 ..	.. Kawasaki ..	1927 1928 1928 1928	279½ p.p.	24·6	14	..	1142/1470	2400/1200	16·5/9·5	1 5·5-in.	4	45	..
I53 .. I55 .. I56 .. I54 .. I63 .. I60 .. I58 ..	Kure .. .. Kure .. .. Kure .. .. Sasebo .. Sasebo .. Sasebo .. Yokusuka ..	1927 1927 1929 1927 1928 1929 1928	331½ p.p.	26	16	..	1650/2100	6000/1800	21/7-9	1 5·5-in.	8	56	—/255
Ro. 31	Mitsubishi ..	1927	243½	20	12·4	..	655/1000	1200/1200	17/10	1 3-in.	6	43	—/75
Ro. 65 .. Ro. 66 .. Ro. 67 ..	Mitsubishi .. Mitsubishi .. Mitsubishi ..	1926 1927 1927	250	24·2	12·4	..	1000/1300	2400/1800	16/10	1 3-in.	6	47	—/75
I. 51 ‡ .. I. 52 ..	Kure ..	1924 1925	330	25	16·8	..	1400/2000	6000/1800	21/7-9	1 4·7-in.	8	..	—/190
Ro. 64 .. Ro. 63, 62, 61 .. Ro. 60 ..	Mitsubishi .. Mitsubishi .. Mitsubishi ..	1925 1924 1923	250	24.2	12·4	..	1000/1300	2400/1800	16/10	1 3-in.	6	47	—/75
Ro. 32, 30 .. Ro. 29 ..	Kawasaki .. Kawasaki ..	1924 1923	243·5	20	12·4	..	655/1000	1200/1200	13/10	1 4·7-in.	4	43	—/75
Ro. 28 .. Ro. 27 .. Ro. 26 ..	Sasebo .. Yokosuka .. Sasabo ..	1923 1924 1922	230 p.p.	20·1	12	..	750/1000	2600/1200	16/10	1 3-in. 1 3-pr.	4 21-in	..	—/75
Ro. 59 .. Ro. 58, 57 ..	.. ..	1923 1922	250	23·5	13	..	900/1082	2400/1200	17/10·5	1 3-in. 1 3-pr.	4 21-in.	65	—/76
Ro. 25, 19, 18, 17 .. Ro. 24 .. Ro. 23 .. 22, 21, 20, 16 ..	Sasebo, Kure Sasebo .. Yokosuka .. Yokosuka, Kure	1921 1920 1923 1922	230	20	12·2	..	740/990	2600/1200	17/10	1 3-in. 1 3-pr.	6 18-in.	43	—/75
Ro. 3, 4, 5	Kawasaki ..	1922	215·2	20	13·5	..	682/950	2600/1200	18/10	1 3-in. 1 3-pr.	5 18-in.	..	—/60
Ro. 56, 55 .. 54, 53 .. 52, 51 ..	Mitsubishi .. Mitsubishi .. Mitsubishi ..	1922 1921 1920	231·5	23·5	13	..	900/1082	2400/1200	17/10·5	1 3-in. 1 3-pr.	6 18-in.	65	—/76
Ro. 15, 14 .. 13 ..	Kure .. .. Kure	1921 1920	230 p.p.	20	12·3	..	740/986	2600/1200	17/10	1 3-in. 1 3-pr.	6 18-in.	48	..
Ro. 12, 11	Kure	1919	227 p.p.	21	11·3	..	720/1035	2600/1200	18/10	1 3-in. 1 3-pr.	6 18-in.	..	—/60
Ro. 1, 2	Kawasaki ..	1920	215·2	20	13·5	..	700/1072	2600/1200	13/10	.. ..	5 18-in.	..	—/65

Sixteen 750-ton submarines projected for completion before 1936.

† Fitted for minelaying.

‡ Carries small seaplane.

Netherlands.

Name or Number.	Where built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-power.	Maximum speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal. / Oil.
			Feet.	Feet.	Feet.		Tons.		Knots				Tons
DESTROYERS—													
*Banckert .. *Van Nes .. *Van Galen *Witte de With	Burgerhout Rotterdam Fijenoord Rotterdam	1929 1930 1928 1928	321·5	31	9·8	2	1620	31,000	34	4 4·7-in., 1 3-in. A.A., 4 1-pr., 4 M. 1 seaplane 24 mines	6 21-in.	130	—/330
*De Ruyter *Evertsen .. *Piet Hein .. *Kortenaer	Flushing Rotterdam	1926 1926 1927 1927	321·5	31	9·8	2	1620	31,000	34	4 4·7-in. 2 3-in. A.A. 24 mines 1 seaplane	6 21-in.	126	—/330
1ST CLASS TORPEDO BOATS—													
*Zeeslang, *Krokodil, *Draak,	Flushing	1907 1906 1906	130	13·8	6·9	1	104	1200–1560	24	2 1-prs.	2	20	20/—
G 13-15-16	Scheldt Fijenoord	1913–1914	162·5	17·3	9·0	..	180	2,600	25	2 3-in.	3	25	40/—
Z 1-4 ..	Amsterdam	1916–1917	201	20·4	6	2	322	5,500	27	2 3-in., 2 M.	4	39	61/8
Z 5-8 ..	Scheldt Fijenoord	1915	192	19·8	5·5	2	310	5,500	27	2 3-in., 2 M.	4	39	70/7
G 12 and 2	..	1903–7	..	..	..	..	..	..	..	24-pr.	3	..	..
SUBMARINES—							Surf./Sub.						
K XIV .. K XV .. K XVI ..	Rotterdam	Bldg.	242	21·5	13·3	..	810/1,000	3000	17/9	1 3·5-in., 2 1·5-in.	6	..	..
K XVII .. K XVIII ..	Fijenoord	Bldg.	..	..	..	..	..	..	..	..	..	..	..
O 12 .. O 13 .. O 14 .. O 15 ..	De Schelde	Bldg.	19·9	18·7	11·5	..	560/700	2,900/—	15/8	2 1·5-in. A.A.	5	..	../—
O 10 ..	Amsterdam	1925	179½	18·7	11½	..	506/627	900/—	12¾/9	1 22-pr. A.A. 1 maxim	5	29	21/—
*K XIII .. *K XII .. *K XI ..	Fijenoord	1924	218·8	20·2	12·2	..	660/810	2,400/—	15/8	1 22-pr., 1 maxim	6	31	—/45
O 11 .. .. O 9	Fijenoord Flushing	1925 1925	179½	18·7	11½	..	506/627	900/—	12¾/9	1 22-pr. A.A., 1 maxim	5	29	—/21
O 8 (ex-British H6)	..	1914	150·3	15·8	12·3	..	364/434	480/320	13/8·5	1 maxim	4	26	—/18
M1 (ex-German UC 8)	Hamburg	1915	111½	10·3	9	..	157/176	80/155	7½/5	1 4-pr. 12 mines	—	16	—/2½
O 7	Fijenoord	1916	112	12·8	9·5	..	177/206	350/185	11·5/8·5	1 maxim	3	12	—/5·4
O 6	De Schelde	1916	115·9	12·8	9·5	..	187/226	350/185	11·5/8·5				
O 5 .. .. O 4 .. .. O 3 .. .. O 2	De Schelde De Schelde De Schelde De Schelde	1913 1913 1912 1911	105 3	10·2	9·5	..	129/147	300/170	11/8·5	1 maxim	2	10	—/3·6
*K X .. *K IX .. *K VIII ..	De Schelde	1923 1922 1922	212	18·3	11·9	..	560/690	1,550/630 1,550/630 1,800/630	15/8	1 22-pr. 1 maxim	4	29	—/45
*K VII .. *K VI .. *K V	Fijenoord	1921 1920 1919	177·2	16·8	12·5	..	550/630	1,200/600	15/8	1 3-in., 1 maxim	6	29	—/76
*K IV .. *K III ..	De Schelde	1920 1919	211·3	18·3	11·5	..	560/700	1,200/600 1,800/600	15/8	1 3-in., 1 maxim.	6	29	—/45
*K II	Fijenoord	1919	172·3	16·8	12·5	..	550/600	1,800/600	15/8	1 3-in., 1 maxim	6	29	—/76

Two flotilla leaders are projected but no money voted. Four destroyers, Nos. IX–XII are projected but no money voted. Eight submarines, O 16 and O 17, K XIX, K XX, K XXI, K XXII, KXXIII, K XXIV, are projected but no money voted.

* Indian Military Marine.

Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Draug, Troll, Garm	Horten ..	1908–13	226	23·5	8·8	2	540	7,500	27·0	6 3-in. Draug has 6 4·7-in. in addition	3	71	95 / 6
TORPEDO BOATS:													
FIRST CLASS—													
Snogg, Stegg, Trygg	Horten ..	1919–1920	173·9	18	5½	2	220	3,500	25	2 3-in.	4	31	30 / —
Hval	Elbing ..	1896–1900	130·0	16·0	6·9	1	100	1,100	21	2 M.	2	19	17 / —
Storm, Brand, Trods	Horten ..												
Laks, Sild, Sael, Skrei	Horten ..	1901	126·4	15·0	6·9	1	100	1,100	21·8	2 M.	2	19	
SECOND CLASS—													
Kjek, Hvas, Kvik, Blink	Fredrikstad	1898	114·5	14·5	6·0	1	73	750	19	2 M.	2	14	11 / —
Lyn, Hauk, Falk ..	Horten ..	1903											
Skarv, Teist	Horten ..	1906–7	133	14·9	6·5	1	100	1,700	25	2 3-pr.	2	18	16 / —
Lom, Jo, Grib.. ..			117	14·5	5·7	1	72	1,100	23	2 M.	2	16	15 / —
Ravn, Orn	Horten ..	1903	113	14·5	5·7	1	73	850	23	2 M.	2	16	
Kjell	Horten ..	1912	135	14·9	6·4	1	100	1,800	25	2 3-pr.	2	19	15 / 16
SUBMARINES—													
A 2, 3, 4	Germania Kiel	1909 to 1913	133·2	15·7	8·9	2	246 / 332	900 / 380	14 / 7	—	3	17	— / 12·8
B 1, 2	Horten ..	1922	167·3	17·5	10·5	2	413– / 545	900 / —	14·5 / 10	1 12-pr.	4	23	— / 21
B 3, 4	Horten ..	1923–24											
B 5, 6	Horten ..	1929											

3 destroyers (1000 tons), 6 torpedo boats (250 tons), and 10 submarines (500 tons), projected but no money has yet been voted.

Soviet Union.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Dzerzhinski	..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Felix Dzerzhinski	Ship & Eng. Co., Nikolaev	1917	303·5	29·5	10·5	..	1326	29,000	33	4 4-in., 2 3-pr., 4 M., can carry 80 mines	12	120	— / 390
Khadji Bey ..													
Nezamojnik ..													
Petroviski ..													
Nezamojni ..													
Shaumyan ..													
Karl Marx ..	Revel.. ..	1915	344·5	31·3	9·7	..	1350	32,700	35	4 4-in., 1 2-pr., 2 M., 80 mines	9	110	— / 400
Jakov Sverdlov													
Kalinin													
Uuritsky	Leningrad..	1914	321·5	30·5	9·25	..	1610	32,000	35			110	— / 400
Volodarski ..													
Rykov													
Engels		1914–1915	314·75	30·5	9·75	..	1260	30,000	35			110	— / 350
Stalin													
Artem													
Voikov-Trotsky													
Lenin													
Bezpokoini* ..	Nikolaev ..	1913–14	307·7	29·5	9	..	1088	25,500	34	3 4-in., 2 3-pr., 4 M.	10	140	— / 260
Gnyevni* ..													
Derski*													
Pospyeshni* ..	Leningrad..	1913–14	321·5	30·5	9·8	..	1100	23,000	34	3 4-in., 2 3-pr., 4 M., 80 mines	10	120	— / 351
Puilki*													
Frunze	Leningrad..	1914	336	31·1	9·8	..	1200	33,000	32	4 4-in., 1 2-pr., 4 M.	8	..	..

* Under French protection at Bizerta.

Soviet Union—*continued.*

Name or Number.	Where Built.	Date of Completion.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surf./Sub.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal/Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
SUBMARINES—													
Revoluzioner	Nikolaiev ..												
Yakobinetz													
Spartakovetz	Sevastopol	Bldg.	..	..	..	..	1100/—	1500/1200	12/—	1 3-in. 1 1-pr.	4	..	..
Dekabrist Narod-voietz	..												
Politrabotnik (ex Ag 26)	..	1924	$150\frac{1}{4}$	$15\frac{3}{4}$	$5\frac{1}{4}$	..	355/467	480/320	13/11	1 6-pr.	4	..	..
Marxist (*ex* Ag 25)	..	1922	$150\frac{1}{4}$	$15\frac{3}{4}$	$15\frac{1}{4}$	..	375/467	480/320	13/11	1 57-mm.			
Kommunist (*ex* Ag 24)	..	1922											
Shakter (*ex*-Ag 23), Ag 22*	..	1920								1 4-in., 2 M.	6	..	—/17
Proletary	..	1916	223	14·5	12·5			2640/900	16/9	1 6-pr., or 2 6-pr., 1 M.	4	33	—/40
Rabotchky	..	1917						2640/900	16/9	42 mines	4	..	
Tyulen*	..	1915	220	14·5	12·7			500/1400	10/11·7	1 4-in., 1 6-pr., 2 M.	4	52	—/2
Politruk ..	..	1913											
Komunar (*ex*-Voikoff)	..												
Utka*	..	1916	223	14·5	12·5		650/784	500/900	10/9	2 11-pr., 1 1-pr., 1 M.	4	52	—/40
Burysevyestnik* ..	..	1918						2640/900	16/9	1 11-pr.	4	..	
Batrak ..	..	1917	..	..	..			2640/900	16/9	2 6-pr., 1 1-pr.	4		
Krasnoarmeyets ..	..	1917	223	14·5	12·6			500/900	10/9	2 6-pr., 1 1-pr., 1 M.	4	33	—/40
Komissar	..	1916											
Bolshevik	..	1916											
Komunar (*ex*-Tigr)	..	1916											
Tovaristch	..	1916											
Krasnoflotetz ..	..	1916											

In addition to the above 6 other submarines are building. * Under French protection.
There are thirty-five destroyers and torpedo-boats completed from 1895 to 1912 of very little if any fighting value.
Many of the above vessels are known to be practically useless until very extensively repaired and refitted.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Coal/Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FLOTILLA LEADERS—													
Almirante Valdés ..	Cartagena ..	Bldg.	$331\frac{3}{4}$	31·7	10·5	2	1,650	42,000	36	5 4·7-in. 1 3-in. A.A. 4 M.	6 21-in.	..	—/540
,, Antequera													
,, Miranda													
Churruca (No. 45) ..		1929											
Alcala Galiano (No. 46)		1930											
Lepanto (No. 44) ..		1928											
Almirante Ferrandiz (No. 42)	..	1928											
José Luis Diez (No. 43)	Cartagena ..	1928											
Sanchez-Barcaiztegui	Cartagena ..	1926											
DESTROYERS—													
Alsedo	Cartagena ..	1922	283	27	10·5	2	1,145	33,000	34	3 4-in., 2 2-pr. A.A.	4 21-in.	70	—/265
Velasco		1923											
Juan Lazaga		1924											
Proserpina*	Clydebank ..	1897	229	$22\frac{1}{4}$	9·9	2	457	7,500	30	2 14-pr. 2 6-pr. 2 1-pr	2 15-in.	74	90/—
Villaamil*	Cartagena ..	1913	$221\frac{1}{4}$	$22\frac{1}{4}$	5·6	..	364	6,250	28	5 6-pr.	4 18-in.	70	80/—
TORPEDO BOATS—													
18 boats	Cartagena ..	1913–1922	164	16·5	4·9	3	177	3,750	26	3 3-pr.	3 18-in.	31	33/—
SUBMARINES—													
E 1	Echevarrieta	1931	237	20·3	11·4	..	750	2800/1000	..	..	6	..	..
C 1, C 2, C 3, C 4 ..	Cartagena ..	1928	247	20·8	13·5	..	900/1270	2000/750	16/9	1 4-in., 1 3-in. A.A.	6 21-in.	..	..
C 5, C 6		1929											
B 1–6	Cartagena ..	1921–24	210	18·9	11·25	..	560/830	1400/850	16/10·5	1 3-in.	4 18-in.	28	—/66
Isaac Peral	Fore River Co., U.S.A.	1916	197	19	11	..	488/750	1200/680	15/10	1 3-in. A.A.	4	24	..

12 submarines are authorised (money voted). * Minelayers.
5 flotilla leaders, Nos. 47 to 51, are projected but no money has yet been voted.

Sweden.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Destroyers—													
Klas Horn .. .. Klas Uggla	Malmo Karlskrona	1931	303·2	29·2	8·5	..	976	26,000	35	3 4·7-in., 2 40-mm. A.A., 2 M.	2 trpl.	125	— / 150
Nils Ehrensköld .. O. H. Nordenskjold	Göteborg Malmö	1926	293	29·2	10·5	..	1,050	25,000	35	3 4·7-in., 2 40-mm. A.A., 2 M.	2 trpl.	125	— / 150
Magne	Thornycroft	1905								2 3-in., 4 6-pr., 2 M.	2 dbl.		
Wale..	Malmo ..	1906											
Ragnar	Malmo ..	1909											
Sigurd	Gothenburg	1909											
Vidar	Malmo ..	1909	216	20·8	9	2	455	8,000–9,000	30·0	4 3-in., 2 M.	2 dbl.	67	80 / —
Hugin	Gothenburg	1909											
Munin	Malmo ..	1910											
Wrangel † .. .. Wachtmeister † ..	Gothenborg	1917	232·8	22	9·2	2	500	12,000	34·0	4 3-in., 2 M.	2 dbl.	72	107 / 6
Torpedo-Boats—													
Castor, Pollux.. ...	Normand & Carlskrona	1908								2 1-pr.			
Vega .. .. Vesta	Carlskrona..	1909											
Spica, Astrea, Iris, Thetis	Bergsund and Gothenburg	1909	128	14·5	8·5	1	120	2,000	25	2 6-prs.	2	18	20 / —
Altair .. .. .. Antares .. .. .. Argo .. .. .. Arcturus	Stockholm ..	1908											
Perseus, Polaris .. Regulus, Rigel ..	Bergsund .. Stockholm ..	1910–1915											
Submarines—													
1st Class—													
Ulven	Naval Yard, Karlskrona	1930	217	21	10·8	..	700 / 850	2800 / —	16 / 9	1 4-in., 1 M	4 20-in.	..	— / 40
Draken .. .. .. Gripen	Naval Yard, Karlskrona	1926 1928											
Bavern .. .. .. Illern .. .. .. Uttern	Naval Yard, Karlskrona	1921	187	19·4	9·2	..	500 / 650	2800 / —	15 / 9	1 3-in., 1 M.	4	..	— / 33
Delfinen..	Bergsund Co., Stockholm	1915	147·7	13·8	9·2	..	300	800	15 / 9	1 6-pr.	2	..	— / 8
Svärdfisken .. .. Tumlaren	Kockum Co., Malmo	1914	137·7	12·5	9·8	..							
Sälen .. .. .. Valrossen .. .. Hajen	Kockum Co., Malmo ..	1920	177·2	16·2	11·2	..	450 / 580	..	..	1 3-in., 1 M.	4	..	— / 23
Minelaying Sub.—													
Valen	..	1925	187·2	23·2	9·4	..	..	..	..	1 3-in., 1 M.	4	..	— / 34
2nd Class—													
Aborren .. .. .. Braxen	Karlskrona D.Y.	1914–15	101·7	11·7	10·2	..	..	..	..	..	2	..	— / 6·5
Laxen .. .. .. Gäddan			88·6	11·7	10·2	..	..	..	..	..	1	..	— / 4·0
No. 3	..	1908–09	139·4	14·8	9·8	..	175 / 225	1000 / 200	15 / 8	..	2	17	..

† Fitted for mine-laying.

Also six small 2nd class torpedo-boats, 60 tons, built 1907–1908.
Two minelaying submarines are projected (no money voted).

United States.

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FLOTILLA LEADER—One in number	..	Proj Bldg.	..	..	..	..	1,850	..	..	7 5-in. ?	..	..	..
DESTROYERS—5 ~~10~~ in number	.. 5 Proj	Bldg.	..	..	..	..	1,500	..	..	6 5-in.	..	..	..
Pruitt													
Sicard	Bath, I.W.	1920											
Preble													
William B. Preston	Norfolk, N.W.	1920											
Noa		1921											
Hulbert		1920											
Decatur		1922											
Perry	Navy Yard, Mare Is.	1922											
Trever		1922											
Wasmuth		1921											
Zane		1921											
Litchfield		1920											
Meade													
Swasey													
Tingey													
Morris													
Thornton	Bethlehem S.B. Co., Squantum												
Bailey													
Shubrick													
Ballard													
Greene													
Edwards													
McLanahan													
Laub		1919											
Gillis													
Turner													
Aulick													
Welles													
Bancroft	Bethlehem S.B. Co., Quincy												
Osmond Ingram													
Rodgers													
McCalla													
McCook													
Belknap													
Lawrence		1920	314·4	31	9·	..	1,051	27,000	35	4 4-in., 1 3-in. A.A.	4 triple	122	375
Hopkins		1921											
Barry		1920					1,190						
Goff		1921								(Kane, Fox, Gilmer, Brooks, and Hatfield have 4 5-in. guns.)			
Bainbridge		1921											
Reuben James													
Williamson													
Sands													
King													
Childs	New York S.B. Co.												
Sturtevant													
Overton													
James K. Paulding		1920											
McFarland													
Humphreys													
Kane													
Fox													
Gilmer													
Brooks													
Hatfield													
Paul Jones		1921											
Truxton		1921											
John D. Ford													
Pillsbury													
Peary													
Pope													
Stewart													
McCormick													
Bulmer	Cramp, Pa.												
Simpson		1920											
MacLeish													
Edsall													
Parrott													
Whipple													
J. D. Edwards													
Borie													
Tracy													

United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—*continued.*													
Barker ..													
Smith Thompson													
Alden ..													
Broome ..		1919	..	..	..	..	..	..	..	Long and Hovey have 8 4-in. in twin mtgs. and 1 3-in. A.A.			
Long													
Hovey ..													
Southard ..													
Chandler ..													
Dallas													
Herndon ..													
Branch ..		1920											
George E. Badger			314·4	31	9·8	..	1,051	27,000	35	4 4-in., 1 3-in. A.A. Semmes has a 5·4-in.	4 triple	122	375
Welborn C. Wood	Newport News S.B. Co.	1921											
Hunt		1920											
Abel P. Upshur		1920											
Mason ..		1920											
Satterlee ..		1919											
Semmes ..													
Goldsborough		1920											
Dahlgren ..													
Clemson ..		1919											
Bagley													
Abbot													
Haraden ..		1919	314·4	31	9·8	..	1,049	27,000	35	4 4-in., 1 14-pr.	4 triple	122	286
Thomas ..													
Hopewell ..													
Stansbury ..		1920											
Howard ..		1920											
Hogan ..													
O'Bannon ..	Union I.W.												
Renshaw ..													
Mackenzie ..													
Kalk													
Foote ..			314·4	31	9·8	..	1,027	27,000	35	4 4-in., 1 3-in. A.A.	4 triple	122	283
Maddox ..		1919											
Cowell ..													
Bush	Fore River S.B. Co.												
Meredith ..													
Crosby ..													
Walker ..													
Thatcher ..													
Palmer ..		1918											
Herbert ..													
Schenck ..	N.Y. S.B. Co.												
Leary ..			314·4	31	9·8	..	1,047	26,000	35	4 4-in., 1 3-in. A.A.	4 triple	122	286
Dickerson ..													
J. Fred Talbot													
Cole													
Ellis													
Bernadou ..		1919											
Dupont ..													
Biddle ..													
Blakeley ..													
Barney ..	Cramp, Phil.		314·4	31	9·8	..	990	26,000	35	4 4-in., 1 3-in. A.A.	4 triple	122	286
Breckenridge													
Roper													
Elliot ..													
Greer													
Upshur ..													
Yarnall ..		1918											
Tarbell ..													
Hamilton ..		1919											
Claxton ..		1919											
Ward	Mare Island, N.Y.	1918											
Kennison ..		1919											
Kilty		1918											
Boggs		1918	314·4	31	9·5	..	990	24,000	35	4 4-in., 1 3-in. A.A.	4 triple	122	286
Tillman ..		1921											
Crowninshield													
Hale	Bath I.W.												
Aaron Ward													
Buchanan ..													
Jacob Jones		1919											
Babbitt ..													
Twiggs ..	New York S.B. Co.		314·4	31	9·8	..	1,047	26,000	35	4 4-in., 1 3-in. A.A.	4 triple	122	286
Badger ..													
Tattnall ..													

United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—*continued.*													
Ramsay .. Gamble .. Breese .. Montgomery Radford .. Lamberton	Newport News S. Co.	1919	314·4	31	9·8	..	1,049	25,000	35	4 4-in.. 1 3-in. A.A.	4 triple	122	286
Lea .. .. Dorsey .. Dent .. .. Waters .. Talbot .. Rathburne ..	Cramp, Pa.	1918	314·4	31	9·8	..	990	26,000	35	4 4-in., 1 3-in. A.A. (Rathburne has 3 4-in.)	4 triple	122	286
Crane .. .. Williams .. Chew .. .. Mugford .. Champlin .. Schley ..	Union Plant.	1919 1919	314·4	31	9·8	..	1,027	27,000	35	4 4-in., 1 3-in. A.A.	4 triple	122	283
Bell	Fore River S.B. Co.	1918											
Taylor .. Fairfax ..	Mare Island, N.Y.		314·4	31	9·8	..	990	24,200	35	4 4-in., 1 3 in. A.A.	4 triple	122	286
Gridley .. Harding .. McKean .. Ringgold .. Robinson .. McKee.. ..	Union I.W.	1919 1919 1919 1918 1918 1918	314·4	31	9·9	..	1,027	27,000	35	4 4-in., 1 3 in. A.A.	4 triple	122	286
Stevens .. Colhoun .. Dyer .. .. Stringham .. Gregory .. Sigourney .. Kimberly .. Little	Fore River S.B. Co.	1918	314·4	31	9·8	..	1,027	27,000	35	4 4-in., 1 3-in. A.A.	4 triple	122	283
Evans .. .. Philip .. .. Wickes ..	Bath I.W.		314·4	31	9·7	..	990	24,200	35	4 4-in., 1 3-in. A.A.	4 triple	122	286
Manley ..		1917	315·5	30·7	9·5	..	939	20,000	32	3 4-in., 1 3-in. A.A.	4 triple	122	260
Stockton .. Conner ..	Cramp Pa.	1917 1918	315·5	30·7	9·5	..	939	18,500	30	5 4-in., 1 3-in. A.A.	4 triple	122	260
Gwin	Seattle D.D. Co.	1920	315·5	30·7	9·5	..	939	18,750	30	4 4-in., 2 3-in. A.A.	4 triple	122	260
Craven ..	Norfolk, N.Y.	1918	315·5	30·7	9 5	..	939	20,000	32	4 4-in., 1 3-in. A.A.	4 triple	122	260
Caldwell ..	Mare Island N.W.	1917	315·5	30·7	9·5	..	939	20,000	30	4 4-in., 1 3-in. A.A.	4 triple	122	260
Allen	Bath I.W.	1917	315·3	29·9	9·8	..	865	17,500	30	4 4-in., 1 3-in. A.A.	4 triple	122	290
Rowan .. Sampson ..	Fore River S.B. Co.	1916	315·3	29·9	10·7	..	905	17,000	29·5	4 4-in., 1 3-in. A.A.	4 triple	122	290
Wadsworth..	Bath I.W.	1915	315·3	29·9	10	..	854	17,000	30	4 4-in.	4 dbl	118	310
Cushing ..	Fore River S.B. Co.	1915	305·3	30·4	10·5	..	854	16,000	29	4 4-in.	4 dbl.	106	308
Winslow .. Nicholson .. O'Brien ..		1915	305·3	30·3	10·5	..	832	16,000	29	4 4-in.	4 dbl.	106	307
Balch .. .. Benham .. Parker .. Aylwin ..	Cramp.	1914 1914 1913 1914	305·3	30·5	10·5	..	819	16,000	29·5	4 4-in.	4 dbl.	106	310
Duncan ..	Fore River S.B. Co.	1913	305·3	30·4	10	..	797	16,000	29	4 4-in. 1 3-in. A.A.	4 dbl.	106	308
Downes	N.Y.S.B. Co.	1915	305·3	30·4	9·8	..	820	16,000	29	4 4 in. 1 3-in. A.A.	4 dbl.	104	306
Cummings Cassin ..	Bath I.W.	1913	305·3	30·4	9·8	..	820	16,000	29	4 4 in. 1 3-in. A.A.	4 dbl.	104	306
McDougal ..	Bath I.W.	1914	305·3	30·6	9·8	..	860	16,000	29·5	4 4-in.	4 dbl.	104	311
Ericsson ..	N.Y.S.B. Co.	1915	305·3	30·6	10·7	..	860	16,000	29	4 4-in.	4 dbl.	104	305
Tucker	Fore R.S.B.Co.	1916	305·3	29·9	10·3	..	910	18,000	29·5	4 4-in.	4 dbl.	104	309
Conyngham ..	Cramp.	1916	315·3	29·9	10·1	..	910	17,500	29·5	4 4-in.	4 dbl.	104	308
Porter . ..	Cramp.	1916	315·3	29·9	10·1	..	910	18,000	29·5	4 4-in.	4 dbl.	104	308
Wainwright ..	N.Y.S.B. Co.	1916	315·3	29·9	10·7	..	910	17,500	29·5	4 4-in.	4 dbl.	104	308
Davis	Bath, I.W.	1916	315·3	29·9	9·8	..	920	17,500	30	4 4-in., 1 3-in.	4 triple	120	290
Wilkes	Cramp.	1917	315·3	29·9	10·7	..	920	17,000	29·5	4 4-in., 1 3-in.	4 triple	120	290
Shaw	Mare I., N.Y	1916	315·3	29·9	10·7	..	920	17,000	29·5	4 4-in., 1 3-in.	4 triple	120	290

In addition to the above there are 21 obsolete destroyers of the Flusser Class, completed 1910–1912. Their displacement is 742 tons, 29·5 knots, carrying 5 or 4 13-pdrs. and 3 double torpedo tubes. Their names are Mayrant, Henley, Jarvis, Beale, Fanning, Jenkins, Jouett, Patterson, Walke, Monaghan. Ammen, Trippe, Warrington, Burrows, McCall, Sterrett, Perkins, Drayton, Terry, Paulding, Roe. 8 of these are on the disposal list.

United States—*continued*.

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Oil.
			Feet.	Feet.	Feet			Tons.	Knots.				Tons.
DESTROYERS NOW FITTED AS MINELAYERS—													
Rizal	Union I.W.	1919	314·4	31	9·8	..	1,191	27,000	35	4 4-in., 1 14-pr. A.A. 92 mines	..	107	283
Sproston ..		1919											
Anthony ..		1919											
Ingraham ..		1919								4 4-in., 1 14-pr. A.A. 92 mines			
Hart		1919											
Lansdale ..	Fore River S.B. Co.	1918								4 4-in., 1 14-pr. A.A. 92 mines			
Luce													
Israel													
Murray ..										3 4-in., 1 14-pr. A.A. 92 mines			
Stribling ..										4 4-in., 1 14-pr. A.A. 92 mines			

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement. Surface. / Submerged.	Horse-Power.	Maximum Speed. Surface. / Submerged.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots				Tons.
SUBMARINES—													
V7 Dolphin	Portsmouth Navy Yard.	Bldg.	319	27·7	..	..	1,540	3,550 / —	17 / 8	1 4-in.	6	..	..
V8 Cachalot			275	..	..	..	1,100		..	..	..	..	..
V9 Cuttlefish													
V4 Argonaut	Portsmouth Navy Yard.	1928	380	33·7	—	..	2,660 / 4,000	2,800 / —	15 / 8	2 6-in., 60 mines	4	86	..
V5 Narwhal	Portsmouth Navy Yard.	1930	371	33·3	16	..	2,730 / 3960	6,000 / —	17 / —	2 6-in.	6	88	..
V6 Nautilus	Mare Island Navy Yard.												
V3 Bonita ..	Portsmouth Navy Yard.	1926	341·5	27·5	15·5	..	1,910 / 2,520	6,500 / —	21 / 9	1 5-in. 2 maxim	6	87	..
V2 Bass ..		1925											
V1 Barracuda		1924											
S48	Lake T.B. Co., Bridgeport	1922	265·3	21·8	13·5	..	990 / 1,230	1,800 / 1,500	14·8 / 11·0	1 4-in.	5	..	237
S47*	Bethlehem Shipbuilding Corp., Quincy Plant	1925	225·3	20·7	16	..	850 / 1,126	1,200 / 1,500	14 / 104	1 4-in.	4	40	154
S46*		1925											
S45*		1925											
S44*		1925											
S43*		1924											
S42*		1924											
S41*	Bethlehem Shipbuilding Corp., Union Plant	1924	219·3	20·7	16	..	800 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in.	4	..	140
S40*		1923											
S39*		1923											
S38*		1923											
S37*		1923											
S36*		1923											
S35*		1923	219·3	20·7	16	..	800 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in.	4	38	140
S34*		1923											
S33*		1923											
S32*		1923											
S31*		1923											
S30*		1920											
S29*	Bethlehem Shipbuilding Corp., Quincy Plant	1924	219·3	20·7	16	..	800 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in.	4	38	140
S28*		1923											
S27*		1924											
S26*		1923											
S25*		1923											
S24*		1923											
S23*		1923											
S22*		1924											
S21*		1923											
S20*		1922											
S19*		1921											
S18*		1923											

* Designed by Electric Boat Co., Groton, Conn.

United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surface. / Submerged.	Horse-Power.	Maximum Speed. Surface. / Submerged.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots				Tons.
SUBMARINES—*continued.*													
S17 .. .. S16 .. .. S15 .. .. S14	Lake T.B. Co., Bridgeport	1921 1920 1921 1921	231	21·8	13	..	790 / 1,092	2,000 / 2,400	15·25 / 9	1 4-in.	4	38	123
S13 .. .. S12 .. .. S11 .. .. S10	Navy Yard, Portsmouth	1923 1923 1923 1922	231	21·8	13	..	790 / 1,092	2,000 / 1,200	15·8 / 9	1 4-in.	5	38	123
S9 .. .. S8 .. .. S7 .. .. S6 .. .. S4† S3		1921 1920 1920 1920 1919 1919	231	21·8	13	..	876 / 1,092	1,400 / 1,200	15 / 12·3	1 4-in.	4	38	123
S1*	Fore River S.B. Co.	1920	219·2	20·7	16	..	800 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in., 1 aeroplane	4	38	140
R20* .. .. R19* .. .. R18* .. .. R17* .. .. R16* .. .. R15* .. .. R14* R13*	Union, I.W.	1918 1918 1918 1918 1918 1918 1919 1919	186·1	18	14·5	..	530 / 680	880 / 934	13·5 / 10·5	1 3-in.	4	30	63
R12* .. .. R11* .. .. R10* .. .. R9* .. .. R8* .. .. R7* .. .. R6* .. .. R5* .. .. R4* .. .. R3* .. .. R2* R1*	Fore River S.B. Co.	1919											
O10* .. .. O9* .. .. O8* .. .. O7* .. .. O6* .. .. O4* .. .. O3*§	Fore River S.B. Co.	1918	172·3	18	14·4	..	480 / 630	880 / 740	14 / 10·5	1 3-in.	4	30	73
N3*§	Morento, Seattle	1917	147·3	15·8	12·5	..	320 / 414	480 / 560	13 / 11	..	4	26	20
L11*§ .. L9*§ .. .. L3*§ .. .. L2*§	Fore River S.B. Co.	1916	168·5	17·4	13·6	..	410 / 548	900 / 680	14 / 10·5	1 3-in.	4	29	65
K8*§ .. .. K7*§	Union I.W., San Francisco	1914	153·5	16·7	13	..	360 / 520	480 / 680	14 / 10·5	..	4	26	57
K6*§ .. .. K5*§	F.R.S. Co.												
K4*§	Moran Co., Seattle, Wash.												
K3*§	Union I.W., San Francisco												
K2*§ .. .. K1*§	F.R.S. Co.												
H3*§	Moran Co., Seattle, Wash.	1914	150·3	15·8	12·4	..	330 / 434	480 / 600	14 / 10·5	..	4	26	32
H2*§	Union I.W., San Francisco	1913											

* Designed by Electric Boat Co., Groton, Conn.
† Used for salvage operations.
§ To be disposed of shortly.

A submarine named Neff (No. 108) is projected—no funds are voted for construction.
All submarines older than O1 are termed second-line submarines, suitable only for coast defence.
The machinery contractors for the 78 vessels of the E. B. Co. Design built in yards other than the Navy Yards were the New London Ship and Eng. Co., Groton, Conn., and the hulls were built under sub-contract from the E. B. Co.

TABLES OF COMPARATIVE NAVAL STRENGTH

TABLE I.—EFFECTIVE FIGHTING SHIPS, BUILT, BUILDING, AND AUTHORISED.

Class.	British Empire.			U.S.A.			Japan.			France.			Italy.			Soviet Union. (a)			Germany.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
Battleships, 14-in. guns and upwards .	12	—	12	14	—	14	6	—	6	—	—	—	—	—	—	—	—	—	—	—	—
Battle-cruisers, 14-in. guns and upwards	3	—	3	—	—	—	4	—	4	—	—	—	—	—	—	—	—	—	—	—	—
Battleships, smaller guns	—	—	—	1	—	1	—	—	—	9	—	9	4	—	4	5	—	5	4	2	6
Battle-cruisers, smaller guns	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Aircraft-carriers and aircraft tenders .	8	—	8	4	1	5	5	1	6	1	1	2	1	—	1	—	—	—	—	—	—
Cruisers	52	{4 3†}	59	20	7 5 (b)	32	27	{4 1†}	32	15	3	18	16	9	25	8	—	8	6	—	6
Flotilla Leaders and Destroyers . . .	151	{13 9†}	173	217	11	228	100	7	107	80	{10 4}	94	92 (d)	4	96 (d)	?58 (c)	1	?59	16 (e)	—	16 (e)
Submarines	58	{6 3†}	67	94	3	97	66	4	70	70	39	109	37	31	68	19	10	29	—	—	—

† Authorised for laying down during current year (money voted).

NOTES:—(*a*) Including vessels under French protection at Bizerta.
(*b*) Authorised for laying down in 1933–5.
(*c*) Exact number uncertain—many of these are at present of no fighting value.
(*d*) There are 35 1st class Torpedo Boats in addition.
(*e*) There are 10 Torpedo Boats in addition.

TABLE II.—BATTLESHIPS WITH 14-IN. GUNS AND UPWARDS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.
		tons.			tons.			tons.												
1925	Nelson	33,500	1921	Colorado	32,500	1920	Mutsu	32,720												
1925	Rodney	33,900	1921	West Virginia	31,800	1919	Nagato													
1915	Malaya	31,100	1920	Maryland	31,500	1917	Hyuga	29,990												
1914	Valiant	31,100	1919	Tennessee	32,300	1916	Ise													
1914	Barham	30,000	1919	California	32,600	1915	Yamashiro	29,330												
1913	Queen Elizabeth	31,100	1917	Idaho	30,800	1914	Fuso													
1913	Warspite	31,100	1917	New Mexico	30,000															
1915	Royal Sovereign		1917	Mississippi	30,100															
1914	Royal Oak		1915	Arizona	32,100															
1915	Revenge	29,150	1915	Pennsylvania																
1916	Resolution		1914	Oklahoma	28,900															
1916	Ramillies		1914	Nevada	28,700															
			1912	Texas	27,000															
			1912	New York																
	12 ships.	367,550		14 ships.	427,400		6 ships.	184,080												

TABLE III.—BATTLE-CRUISERS WITH 14-IN. GUNS AND UPWARDS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.
		tons.						tons.												
1918	Hood	42,100				1913	Kirishima	29,330												
1916	Renown	32,000				1913	Haruna													
1916	Repulse					1912	Hiyei *													
						1912	Kongo													
	3 ships.	106,100					4 ships.	117,320												

* To be retained as a training ship in accordance with London Naval Treaty.

TABLE IV.—BATTLESHIPS WITH GUNS BELOW 14-IN.

BRITISH EMPIRE.*

Launched.	Name.	Standard Displacement.

UNITED STATES.*

Launched.	Name.	Standard Displacement.
		tons.
1911	Arkansas	26,100
	1 ship.	26,100

JAPAN.

Launched.	Name.	Standard Displacement.

FRANCE.

Launched.	Name.	Standard Displacement.
		tons.
1913	Bretagne	
1913	Lorraine...	
1913	Provence	22,189
1911	Courbet ...	
1911	Jean Bart	
1912	Paris ...	
1909	Diderot ...	
1909	Condorcet	17,597
1909	Voltaire ...	
	9 ships.	185,925

ITALY.

Launched.	Name.	Standard Displacement.
		tons.
1913	Andrea Doria	21,555
1913	Caio Duilio ...	
1911	Conte di Cavour	21,604
1911	Giulio Cesare	21,819
	4 ships.	86,533

SOVIET UNION.

Launched.	Name.	Standard Displacement.
		tons.
1914	General Alexieff †	22,600
1911	Paris Commune	
1911	Marat ...	
1911	Michael Frunze	23,000
1911	October Revolution	
	5 ships.	114,600

GERMANY.

Launched.	Name.	Displacement.
		tons.
1905	Hannover ..	
1906	Schleswig-Holstein	13,040
1906	Schlesien ...	
1903	Hessen ...	13,000
	Building:—	
1931	*Deutchland*	10,000
—	*Ersatz Lothringen*	
	6 ships.	72,120

* See note (*) below.

† Under French protection at Bizerta.

TABLE V.—BATTLE-CRUISERS WITH GUNS BELOW 14-IN.

BRITISH EMPIRE.†			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.

* Emperor of India and Marlborough (Great Britain) and Florida and Utah (United States) were disposed of in 1931 in accordance with the London Naval Treaty, and Iron Duke (Great Britain) and Wyoming (United States) were retained as training ships.

† Tiger was disposed of in 1931 in accordance with the London Naval Treaty.

Table VI.—Cruisers

BRITISH EMPIRE.

Speed.	Name.	Standard Displacement.
kts.		tons.
32½	London	
32½	Devonshire ...	10,000
32½	Shropshire ...	
32½	Sussex	
31½	Berwick... ..	
31½	Cornwall ...	
32	Kent	10,000
31½	Suffolk	
31½	Cumberland ...	
32	Australia (A)	10,000
32	Canberra (A)	
33	Emerald ...	7,550
33	Enterprise ...	7,580
30½	Effingham ...	9,770
30½	Frobisher ...	9,860
29½	Hawkins ...	9,800
29	Despatch ...	4,850
29	Diomede (N.Z.)	
29	Durban	
29	Delhi	
29	Dunedin (N.Z.)	4,850
29	Danae	
29	Dauntless ...	
29	Dragon	
29	Capetown ...	
29	Cairo	
29	Calcutta	4,200
29	Carlisle	
29	Colombo... ...	
29	Cardiff	4,290
29	Coventry ...	
29	Curlew	
29	Ceres	4,290
29	Curacoa	
29	Caledon	
29	Calypso	4,180
29	Caradoc ...	

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
	Omaha ...	
	Milwaukee	
	Cincinnati ...	
	Raleigh ...	
	Detroit ...	
33·7	Richmond ...	7,050
	Concord ...	
	Trenton ...	
	Marblehead	
	Memphis ...	
21	Rochester ...	8,150
22	Pittsburg ...	13,680
32½	Salt Lake City ...	
32½	Pensacola ...	
32·7	Northampton	
	Chester ...	
	Louisville ...	10,000
32½	Chicago ...	
	Houston ...	
	Augusta ...	
	New Orleans	
	Portland ...	
32·7	*Astoria* ...	
	Indianapolis	
	Minneapolis	
32½	*Tuscaloosa*	
	San Francisco	10 000
	Three in no. authorised (to be laid down 1933–5).	

JAPAN.

Speed.	Name.	Standard Displacement.
kts.		tons.
33	Nachi	10,000
33	Myoko ...	
33	Ashigara ...	10,000
33	Haguro ...	
33	Kako	
33	Furutaka ...	7,100
33	Kinugasa ...	
33	Aoba	
33	Naka	5,195
33	Sendai ..	5,195
33	Jintzu ...	5,195
33	Nagara ...	5,170
33	Kinu	5,170
33	Abukuma ...	5,170
33	Natori ...	5,170
33	Isudzu ...	5,170
33	Yura	5,170
33	Kuma... ...	
33	Tama	
33	Kitakami ...	5,100
33	Kiso	
33	Oi	
33	Yubari ...	2,890
33	Tenryu ..	3,230
33	Tatsuta ...	3,230
26	Yahagi ...	4,400
26	Hirado ...	
33	*Takao* ...	
33	*Atago* ...	10,000
33	*Chokai* ...	
33	*Maya* ...	
	One in no. authorised	8,500

FRANCE.

Speed.	Name.	Standard Displacement.
kts.		tons.
33·2	Tourville	10,000
34	Duquesne	
33	Suffren ...	10,000
34	Duguay-Trouin	
34	La Motte Picquet	7,249
34	Primauguet ...	
27¼	Metz ... ... (*ex*-Konigsberg)	5,265
28¼	Mulhouse ... ... (*ex*-Stralsund)	4,527
27	Strasbourg ... (*ex*-Regensburg)	4,723
27	Thionville... ... (*ex*-Novara)	2,922
23	Waldeck Rousseau	12,617
23	Ernest Renan ...	12,234
22	Jules Michelet...	11,072
32	Colbert	10,000
32	Foch	10,000
26·5	*Jeanne d'Arc* ..	6,500
32	*Dupleix*	10,000
32	*Algerie*	10,000

ITALY.

Speed.	Name.	Standard Displacement.
kts.		tons.
35	Trento ...	10,000
35	Trieste ...	
27	Taranto	3,184
28	Quarto	2,9 3
27¼	Ancona	3,838
27¼	Bari	3,248
27	Brindisi	2,756
27	Venezia	2,756
22	Libia...	3,700
22¼	San Giorgio ...	9.232
23	San Marco ...	9.350
23	Pisa	8,758
37	Alberto da Guissano	
37	Alberico di Barbiano	
37	Bartolomeo Colleoni	4,896
37	Giov. della Bande Nere	
32	*Zara*	10,000
32	*Fiume*	
32	*Gorizia*	10.000
36	*Bolzano*	10,000
37	*Armando Diaz*	5,089
37	*Luigi Cadorna*	5,089
32	*Pola*	10,000
37	*Montecuccoli*	5,500
37	*Attendolo*	5,500

SOVIET UNION.

Speed.	Name.	Displacement.
kts.		tons.
29¼	Profintern ...	6,800
29¼	Chervonaya-ukrainia...	7,600
23	General Kornilov *	6,675
23	Komintern	6,675
19	Almaz * ...	3,300
20	Aurora ...	6,730
29½	Krasni Kavkas ...	7,000
25	Voroshilov	6,800

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
29	Emden ...	6,000
32	Königsberg	6,000
32	Karlsruhe	6,000
22	Hamburg ...	3,280
32	Köln ...	6,000
32	Leipzig ...	6,000

(A) Australian Navy. (N.Z.) New Zealand Navy. * Under French protection at Bizerta.

TABLE VI.—CRUISERS (*continued*).

BRITISH EMPIRE.		
Speed.	Name.	Standard Displace-ment.
kts.		tons.
29	Concord	4,120
29	Centaur	
29	Cambrian ...	
29	Canterbury ...	
29	Constance ...	3,920
29	Castor	
29	Champion ...	
29	Comus	3,895
30	Vindictive ...	9,996
25½	Adelaide (A)...	5,100
25½	Brisbane (A)...	5,120
32¼	Norfolk	10,000
32¼	Dorsetshire ...	10,000
32¼	York	8,400
32¼	*Exeter*	8,400
	Leander	7,000
	Neptune ...	7,000
	Orion	7,000
	Achilles ...	7,000
	Authorised :—	
	One in number	about 5,000
	Two in number of "Leander" class	—
	56 ships. (and 3 authorised.)	365,100

UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Speed.	Name.	Standard Displace-ment.	Speed.	Name.	Standard Displace-ment.	Speed.	Name.	Standard Displace-ment.	Speed.	Name.	Standard Displace-ment.	Speed.	Name.	Di-place-ment.	Speed.	Name.	Displace-ment.
kts.		tons.	kts		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts		tons.
32½																	
	27 ships. (and 3 authorised.)	242,330		31 ships. (and 1 authorised.)	198,655		18 ships.	151,607		25 ships.	160,487		8 ships.	51,580		6 ships.	33,280

(A) Australian Navy.

(N.Z.) New Zealand Government.

NOTE.—Vessels of which the names are printed in italics are under construction.

TABLE VII.—AIRCRAFT CARRIERS AND AIRCRAFT TENDERS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.
		tons			tons.			tons.			tons.			tons.						
1916	Furious ...	22,450	Con-	Langley ...	11,500	1920	Notoro ‡	14,050	1920	Béarn † ...	22,146	1923	Miraglia	4,881						
1917	Argus ...	14,450	verted	(formerly col-		1921	Hosho ..	7,470	1929	*Comman-*										
1917	Ark Royal	6 900	1921	lier Jupiter)		1925	Akagi *	26,900		*dant Teste*	10,000									
1914	Hermes ...	10,850	Do.	Wright § ...	9,553	1921	Kaga †	26,900												
1919	Eagle † *	22,600	1925	Lexington * ..	} 33,000															
1918	Courageous	22,500	1925	Saratoga * ...			*Ryujo*	7,600												
1928	Albatross (A)	5,000	—	*Ranger* ...	13,800															
1916	Glorious *	22,500																		
	8 ships.	127,250		5 ships.	100,853		5 ships.	82,920		2 ships.	32,146		1 ship.	4,881		Nil	—		Nil	—

* Designed as battle-cruisers; converted to aircraft-carriers under the Washington Treaty.
† Designed as battleships.
‡ Converted from an oiler.
§ Aircraft repair ship.
(A) Australian Navy.

NOTE.—Vessels of which the names are printed in italics are under construction.

BRITISH AND FOREIGN ORDNANCE TABLES

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS.

Tables Corrected by the Manufacturers, October, 1931.

NAVAL GUNS AND MOUNTINGS.

		37 mm. 1·2-pdr. Auto.	37 mm. 1½-pdr. Auto.	40 mm. 2-pdr. Auto.	40 mm. 2·2-pdr. Auto.	47 mm. 3-pdr. Semi-Auto.	57 mm. 6-pdr. Semi-Auto.	4-in. 101·6 mm. Semi-Auto.	4-in. 101·6 mm.	4·7-in. 120 mm. Semi-Auto.	4·7-in. 120 mm. Semi-Auto.	5·118-in. 130 mm. Semi-Auto.	5·5-in. 139·7 mm. Semi-Auto.
Diameter of Bore	ins.	1·457	..	1·575	1·575	1·85	2·244	4	4	4·724	4·724	5·118	5·5
do. do.	mm.	37	..	40	40	47	57	101·6	101·6	120	120	130	139·7
Length of Bore	cals.	30	53·5	40	50	50	50	45	50	45	50	52	50
		lbs.	lbs.	lbs.	lbs.	cwts.	c. q.	c. q.	c. q.	t. c.	t. c.	t. c.	t. c.
Weight of Gun		432	400	616	900	6	9 1	36 0	40 0	2 19	3 7	4 8	4 13
do. do.	kg.	196	181·5	279	408	305	470	1,830	2,032	3,000	3,415	4,470	4,740
Weight of Projectile	lb.	1	1·203	2	2·2	3·3	6	31	31	48·5	48·5	70	79·37
do. do.	kg.	0·454	0·545	0·907	1,000	1·5	2·72	14·06	14·06	22·0	22	31·75	36
Muzzle Velocity	f.s.	1,800	3,000	2,000	2,625	2,800	2,600	2,700	3,000	2,789	3,000	2,953	3,000
do. do.	m.s.	549	914	610	800	853	792	823	914	850	914	900	914
Muzzle Energy	f.t.	22·5	75	55·5	105	180	280	1,565	1,935	2,616	3,025	4,235	4,953
do. do.	m.t.	7	23·2	17·2	32	55·75	86·7	485	600	810	935	1,310	1,535
Penetration	ins.	..	..	..	..	6·7	7·5	13·6	16	16·6	18·0	20	22
do.	mm.	..	..	..	..	170	190	345	405	420	460	510	560
Rounds per Minute		250	100	200	..	30	28	18	15	12	12	..	..
				lb.		c. q. lb.	c. q. lb.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q. lb	t. c. q. lb.
Weight of Mounting and Shield		..	..	1,040	..	11 2 5	17 3 10	2 18 3	3 5 1	3 5 2	4 1 0	8 1 0 0	9 2 0 0
do. do. do.	kg.	..	..	472	..	586	906	2,985	3,315	3,330	4,115	8,179	9,246
		..	..	..	..	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.		c q. lb.	t. c. q lb.
Weight of Shield		..	..	..	..	1 0 20	1 2 10	7 2 0	14 1 13	9 0 0	..	19 0 0	1 2 0 0
do. do.	kg.	..	..	..	..	60	70	380	730	460	..	965	1,188
Thickness of Shield	ins.	..	..	..	..	·22	·25	·144	·25	·144	..	0·144	·1875
do. do.	mm.	..	..	..	..	5·6	6·35	3·65	6·35	3·65	..	3·65	4·76
Angle of Elevation	deg.	..	..	80	..	20	20	80	30	35	35	35	35
Angle of Depression	deg.	..	..	5	..	10	10	10	10	10	10	10	10

The above guns are of all-steel construction. Guns of steel and wire construction are manufactured having approximately the same characteristics.

NAVAL GUNS AND MOUNTINGS—*continued.*

		6-in. 152 mm.	5·906-in. 150 mm. Semi-Auto.	6-in. 152 mm.	8-in. 203 mm.	8-in. 203 mm.	8-in. 203 mm.	9·2-in. 234 mm.	10-in. 254 mm.	12-in. 305 mm.	13·5-in. 343 mm.	14 in. 356 mm.	15-in. 381 mm.	16-in. 406 mm.
Diameter of Bore	ins.	6	5·906	6	8	8	8	9·2	10	12	13·5	14	15	16
do. do.	mm.	152·4	150	152·4	203·2	203·2	203·2	233·7	254	304·8	342·9	355·6	381	406·2
Length of Bore	cals.	45	20	50	45	50	55	50	50	50	45	50	45	45
Weight of Gun		t. c. 6 10	t. c. 7 4	t. c. 6 18	t. c. 14 0	t. c. 15 14	t. c. 16 10	t. c. q. 28 16 2	t. c. 26 1	t. c. 43 10	t. c. 66 0	t. c. 80 0	t. c. 87 0	t. c. 105 0
do. do.	kg.	6,605	7,315	7,010	18,290	15,940	16,765	29,290	26,470	44,200	67,060	81,284	88,400	106,685
Weight of Projectile	lb.	100	100	100	250	256	256	380	500	850	1,400	1,560	1,951	2,000
do. do.	kg.	45·36	45·4	45·4	113·4	116·0	116·0	172·37	226·8	385·6	635	707·6	885	907·2
Muzzle Velocity	f.s.	2,850	2,940	3,050	2,845	3,000	3,150	3,000	2,933	2,933	2,500	2,475	2,500	2,650
do. do.	m.s.	869	896	930	867	914	960	914	894	894	762	754	760	808
Muzzle Energy	f.t.	5,630	5,995	6,450	14,030	15,976	17,615	23,714	29,825	50,705	60,675	66,260	84,550	97,390
do. do.	m.t.	1,745	1,857	2,000	4,345	4,950	5,445	7,340	9,235	15,705	18,790	20,520	26,185	30,160
Penetration	ins.	22	23	24	31	34·5	38	38·8	41·7	50·3	51·5	51·65	55	59
do.	mm.	560	585	610	785	875	965	985	1,060	1,280	1,310	1,310	1,400	1,500
Rounds per Minute		10	..	..	5	6	6	4	3	2	1·5	1·5	..	1·2
Weight of Mounting and Shield		t. c. q. 12 9 2	t. c. q. lb. 11 18 0 0	t. c. q. lb. 12 1 0 0	..	..	..	..	..	..	..	..	..	..
do. do. do.	kg.	12,675	12,091	12,245	..	..	..	..	..	..	..	..	..	..
Weight of Shield		t. c. q. lb. 4 4 3 16	t. c. q. lb. 3 4 0 0	t. c. q. lb 3 4 0 0	..	..	..	..	..	..	..	..	..	..
do. do.	kg.	4,315	3,250	3,250	..	..	..	..	..	..	..	..	..	..
Thickness of Shield	ins.	1·5 & 1	·625 & ·375	·625 & ·375	..	..	..	..	..	..	..	..	..	..
do. do.	m.m	38 & 25·4	16 & 9·5	16 & 9·5	..	..	..	..	..	..	..	..	..	..
Angle of Elevation	deg.	30	35	35	..	..	..	..	..	..	..	..	..	..
Angle of Depression	deg.	5	10	10	..	..	..	..	..	..	..	..	..	..

The above guns are of all-steel construction. Guns of steel and wire construction are manufactured having approximately the same characteristics.

		2·953-in. 75 mm. Field.	2·953-in. 75 mm. Field.	4·134-in. 105 mm. Field Howr.	4·134-in. 105 mm. Field.	4·134-in. 105 mm. Field.	5-in. 127 mm. Field.	5·9-in. 150 mm. Howr.	6-in. 152 mm. Field.	8-in. 203 mm. Railway.	8·268-in. 210 mm. Semi-Mobile.	12-in. 305 mm. Railway.	15-in. 381 mm. Railway.
Diameter of Bore	ins.	2·953	2·953	4·134	4·134	4·134	5	5·9	6	8	8·268	12	15
do. do.	mm.	75	75	105	105	105	127	150	152	203	210	305	381
Length of Bore	cals.	30	40	21	26	45	41	21	45	50	40	50	45
		c. q.	c. q.	c. q.	c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c.	t. c.	t. c.	t. c.
Weight of Gun		7 3	11 3	11 2	12 0	1 12 0	3 11 3	1 11 0	5 12 1	15 5	10 19	43 10	87 0
do. do.	kg.	394	597	584	610	1,625	3,646	1,575	5,700	15,500	11,125	44,200	88,400
Weight of Projectile	lb.	14·33	15·43	26·45	33·07	35·27	56	90·4	100	256	286·6	850	1,951
do. do.	kg.	6·5	7·0	12·0	15·0	16·0	25·5	41·0	45·4	116	130	385·6	885
Muzzle Velocity	f.s.	1,952	2,362	1,608	2,000	2,690	2,700	1,903	2,870	2,900	2,608	2,933	2,[illegible]00
do. do.	m.s.	595	720	490	610	820	823	580	875	884	795	894	760
Muzzle Energy	f.t.	379	597	474	915	1,770	2,830	2,270	5,730	14,930	13,515	50,705	84,550
do. do.	m.t.	117	185	147	285	548	877	703	1,774	..	4,185	15,705	26,185
Rounds per Minute		25	..	10	10	..	..	4	4	4	3	5 in 2 mins.	2
		t. c. q. lb.		c. q. lb.	t. c. q. lb.			t. c. q. lb.	t. c. q. lb.	t. c.	tons	tons	tons
Weight of Mounting and Shield		1 1 1 25	..	19 1 16	1 9 2 0	..	..	3 10 3 0	7 13 3 20	62 8	28	175	275
do. do. do.	kg.	1,091	..	985	1,498	..	..	3,594	7,820	63,400	28,450	177,800	279,400
		c. q. lb.		c. q. lb.	c. q. lb.								
Weight of Shield		1 2 10	..	1 2 24	0 3 0	..	..	No Shield	No Shield	No Shield	No Shield	No Shield	No Shield
do. do.	kg.	80·7	..	87	38	..	..	..	..	..	..	..	..
Thickness of Shield	ins.	·116	..	·125	·16	..	..	..	..	..	..	..	..
do. do.	mm.	2·9	..	3·2	4·06	..	..	..	..	..	..	..	..
Angle of Elevation	deg.	40	..	40	45	..	..	45	45	50	50	35½	40
Angle of Depression	deg.	5	..	5	5	..	..	0	5	0	2	0	0

		TANK GUNS.			MOUNTAIN HOWITZERS.		LANDING GUN.
		57-mm. 6-pdr. Semi-Auto.	47-mm. 3-pdr. Semi-Auto.	40-mm. 2-pdr. Semi-Auto.	2·953-in. (75 mm.) Jointed.	4·134-in. (105 mm.) Jointed.	3-in. (76·2 mm.)
Diameter of Bore	ins.	2·244	1·85	1·575	2·953	4·134	3
do. do.	m.m.	57	47	40	75	105	76·2
Length of Bore	cals.	27	35	37	17	11	22
		c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.
Weight of Gun		2 2 14	2 2 0	1 2 0	3 1 24	5 0 0	3 3 4
do. do.	kg.	133	127	76	177	254	192
Weight of Projectile	lb.	6	3·3	2	14·33	26·45	12·5
do. do.	kg.	2·72	1·5	0·907	6·5	12	5·67
Muzzle Velocity	f.s.	1,200	1,854	2,000	1,450	1,148	1,640
do. do.	m.s.	366	565	610	442	350	500
Muzzle Energy	f.t.	60	79	55·5	210	242	233
do. do.	m.t.	18·6	24·5	17·2	65·0	74·5	72·0
Rounds per Minute		..	..	..	18	10	25
		c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.
Weight of Mounting and Shield		2 2 0	2 2 0	2 1 7	10 2 0	11 1 21	10 0 0
do. do. do.	kg.	127	127	117·5	533	581	508
					c. q. lb.	c. q lb.	c. q. lb.
Weight of Shield		..	..	..	1 1 20	1 2 10	1 1 15
do. do.	kg.	..	..	..	73	81	70
Thickness of Shield	ins.	..	..	..	·16	·16	·192
do. do.	mm.	..	..	..	4·0	4·0	4·875
Angle of Elevation	deg.	30	30	25	45	45	23
Angle of Depression	deg.	10	10	10	5	5	10

Vickers-Armstrongs Limited—Guns and Mountings.—Guns Mounted on Aircraft.

		*·303-in. (7·7 mm.) Auto. Observer's gun.	*·303-in. (7·7 mm.) Auto. Pilot's gun.	·5-in. (12·7 mm.) Auto. Pilot's gun.	·8-in. (20·3 mm.) Auto.	·8-in. (20·3 mm.) Auto.	1·457-in. (37 mm.) Auto.	1·575-in. (40 mm.) Semi-Auto.
Diameter of Bore	ins.	·303	·303	·5	·8	·8	1·457	1·575
do. do.	mm.	7·7	7·7	12·7	20·3	20·3	37	40
Length of Bore	cals.	79·2	93·7	60	70	45	44·5	40
Weight of Gun	lb.	22	30	52	152	145	218	234
do. do.	kg.	10	13·6	23·6	69	66	98·9	106
Weight of projectile	lb.	174 grs.	174 grs.	550 grs.	·2833	·2833	1·5	2
do. do.	kg.	11·3 grms.	11·3 grms.	35·7 grms.	·1285	·1285	0·68	0·91
Muzzle Velocity	f.s.	2,300	2,400	2,630	2,900	2,200	2,000	2,300
do. do.	m.s.	700	732	803	885	670	609·6	700
Muzzle Energy	f.t.	0·9	1	3·75	16·5	9·5	41·6	73
do. do.	m.t.	0·28	0·31	1·16	5·1	2·95	12·88	22·6
Rounds per Minute		500–600	500–1,000	400–600	120	90	115	..
Weight of Mounting	lb.	..	..	..	102	102	102	432
do. do.	kg.	..	..	..	46	46	46	196
Angle of Elevation	deg.	..	..	..	50	50	50	60
Angle of Depression	deg.	..	..	..	50	50	50	30

* This machine can be adapted to fire any pattern of rifle calibre ammunition.

Machine Guns—Anti-Aircraft.

		Vickers ·303-in. (7·7 mm.) Auto.	Vickers-Armstrongs Colt, ·303-in. (7·7 mm.) Auto.	Vickers (12·7 mm.) ·5-in. Auto.	Vickers ·5-in. H.V. (12·7 mm.)	Vickers-Armstrongs Colt, ·5-in. (12·7 mm.) Auto.	Vickers-Armstrongs Colt, ·8-in. (20·3 mm.).	Vickers-Armstrongs Colt, 1·457-in. (37 mm.) Auto.	Vickers 40-mm. 2-pdr. Auto.	Vickers 40-mm. 2·2-pdr. Auto.
Diameter of Bore	ins.	·303	·303	·5	·5	·5	·8	1·457	1·575	1·575
do. do.	mm.	7·7	7·7	12·7	12·7	12·7	20·3	37	40	40
Length of Bore	cals.	93·7	79	60	90	72	70	53·5	39·37	50
Weight of Gun	lb.	32	30	52	81	82	147	400	616	900
do. do.	kg.	14·5	13·6	23·6	36·7	37·2	66·6	181·5	280	408
Weight of Projectile	lb.	·249	·249	·079	·095	·115	·283	1·2	2	2·2
do. do.	kg.	·113	·113	·036	·043	·052	·1285	·545	·9	1·0
Muzzle Velocity	f.s.	2,440	2,400	2,630	3,000	2,450	2900	3,000	1,972	2,625
do. do.	m.s.	744	732	803	914	747	885	914	600	800
Muzzle Energy	f.t.	1	0·9	3·75	5·92	4·77	16·5	75	54	105
do. do.	m.t.	·31	0·28	1·16	1·83	1·48	5·1	23·2	17	32
Rounds per minute		500–600	650	400–600	300	650	120	100	200	..
Weight of Mounting	lbs.	38	56	182	111	86	400	900	1,243	..
do. do.	kgs.	17·25	25·4	82·6	50·4	39	181	407	563·8	..
Angle of Elevation	deg.	80	75	90	90	75	90	90	80	..
Angle of Depression	deg.	20	35	5	5	35	5	5	5	..

	44–60 mm.			47 mm.			65 mm.		
	44 mm. Barrel.		60 mm. Barrel.	Armour-Piercing Ammunition.		High-Explosive Ammunition.	High Explosive Ammunition.		
Diameter of Bore . . . . ins.	1·73		2·36		1·85			2·559	
do. do. . . . . mm.	44		60		47			65	
Length of Bore . . . . . cals.	30		20		20			16	
	Barrel.	Breech Ring.	Breech Mechanism.	Barrel.	Breech Ring.	Breech Mechanism.	Barrel.	Breech Ring.	Breech Mechanism.
Weight of Gun	75 lb.	50 lb.	26 lb.	78 lb.	55 lb.	31 lb.	88 lb.	62 lb.	38 lb.
do. do. . . . . . . kg.	34	22·7	11·8	35·4	25	14	38	28	17
Weight of Projectile . . lb.	2·75		5·5	3·3		3·3		8·818	
do. do. . . . . kg.	1·25		2·5	1·5		1·5		4	
Muzzle Velocity . . . . . f.s.	1,706		732	1,600		755		820	
do. do. . . . . . . m.s.	520		223	488		230		250	
Muzzle Energy . . . . . . f.t.	55·5		20·4	58·6		13·0		41·0	
do. do. . . . . . . m.t.	17·2		6·3	18		4		12·7	
Weight of Mounting and Shield lb.		326			397			408	
do. do. do. kg.		148			180			185	
Weight of Shield . . . . . lb.		—			45			50	
do. do. . . . . kg.		..			20·4			22·6	
Thickness of Shield . . . . ins.		..			0·14			0·14	
do. do. . . . . mm.		..			3·5			3·5	
	44 mm. Barrel.		60 mm. Barrel.	Low Position.		High Position.	Low Position.		High Position.
Angle of Elevation . . . deg.	10		20 to 60	15		45	20		45
Angle of Depression . . . deg.	5		0	10		2½	10		2½

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS. MACHINE GUNS.

		*Vickers ·303-in. (7·7-mm.) Auto. Observer's Gun for Air-craft.	*Vickers ·303-in. (7·7-mm.) Auto. Pilot's Gun for Air-craft.	*Vickers ·303-in. (7·7-mm.) Auto. Land Service and Naval.	*Vickers-Arm-strongs Colt ·303-in. (7·7-mm.) Auto. Ob-server's Gun for Air-craft.	*Vickers-Arm-strongs Colt ·303-in. (7·7-mm.) Auto. Pilot's Gun for Air-craft.	*Vickers-Arm strongs Colt ·303-in. (7·7-mm.) Auto. Land and Naval.	Vickers ·5-in. (12·7-mm.) Auto. Land and Naval.	Vickers ·5-in. (12·7-mm.) Auto. Pilot's Gun for Air-craft.	Vickers-Arm-strongs Colt ·5-in. (12·7-mm.) Auto. Land and Naval.	Vickers-Arm-strongs Colt ·5-in. (12·7-mm.) Auto. Pilot's Gun for Air-craft.	Vickers-Arm-strongs Colt ·8-in. (20·3-mm.) Auto. for Naval.	Vickers-Arm-strongs Colt ·8-inch (20·3-mm.) Auto. for Air-craft.	Vickers-Arm-strongs Colt 1·457-in. (37 mm.) Auto. for Air-craft.	Vickers 1·575-in. (40-mm.) Auto-Naval.	Vickers 1·575-in. (40-mm.) 2·2-pdr. Auto.
Diameter of Bore	ins.	·303	·303	·303	·303	·303	·303	·5	·5	·5	·5	·8	·8	1·457	1·575	1·575
do. do.	mm.	7·7	7·7	7·7	7·7	7·7	7·7	12·7	12·7	12·7	12·7	20·3	20·3	37	40	40
Length of Bore	cals.	79·2	93·7	93·7	79	79	79	90	60	72	72	70	45	44·5	39·37	50
Weight of Gun	lb.	22	30	32	24·75	24·75	36·75	80	52	82	52	147	145	218	616	900
do. do.	kg.	10	13·6	14·5	11·2	11·2	16·67	36·5	23·6	37·2	23·6	66·6	66	98·9	280	408
Weight of Projectile	grs.	174	174	174	174	174	174	770 / 664	550	805	805	1,985	1,985	10,500	14,010	2·2 lb.
do. do.	grms.	11·3	11·3	11·3	11·3	11·3	11·3	50 / 43	35·7	52	52	128·5	128·5	680·0	908·0	1000
Muzzle Velocity	f.p.s.	2,400	2,440	2,440	2,400	2,400	2,400	2,725 / 3,000	2,630	2,450	2,450	2,900	2,200	2,000	1,972	2625
do. do.	m.p.s.	732	744	744	732	732	732	830 / 914	803	747	747	885	670	609·6	600	800
Muzzle energy	f.t.	0·9	1	1	0·9	0·9	0·9	5·65 / 5·92	3·75	4·77	4·77	16·5	9·5	41·6	54	105
do. do.	m.t.	0·28	0·31	0·31	0·28	0·28	0·28	1·75 / 1·83	1·16	1·48	1·48	5·1	2·95	12·88	17	32
Rounds per minute		500–600	500–1000	500–600	1,200	1,200	650	300–400	400–600	400–650	400–650	120	90	115	200	..
Weight of Mounting	lb.	..	..	38	..	..	56	109	..	86	—	400	102	102	1,243	..
do. do.	kg.	..	..	17·25	..	..	25·4	50	..	39	..	181	46	46	563·8	..
Angle of Elevation		..	..	80°	..	..	75°	90°	..	75°	..	90°	50°	50°	80°	..
Angle of Depression		..	..	20°	..	..	35°	5°	..	35°	..	7°	50°	50°	5°	..

* These machine guns can be adapted to fire any pattern of rifle calibre cartridge.

Anti-Aircraft Guns.

		·303-in. Auto.	·5-inch Auto.	·8-inch Auto.	40-mm. 2-pr. Auto.	40-mm. 2·2-pdr. Auto.	40-mm. 2·2-pdr. Semi-Auto.	47-mm. 3-pdr. Semi-Auto.	Mobile 75 mm. 40 Calibre Semi-Auto.	Mobile 75 mm. 46 Calibre S. mi-Auto.	3-inch Q.F.	3-inch Semi-Auto.	4-in. Semi-Auto.	4-in. Semi-Auto.	Mobile 105 mm. 45 Calibre Semi-Auto.	4·7-in. Semi-Auto.
Construction		Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore	ins.	·303	·5	·8	1·575	1·575	1·575	1·85	2·953	2·953	3	3	4	4	4·134	4·724
" "	mm	7·7	12·7	20·3	40	40	40	47	75	75	76·2	76·2	101·6	101·6	105	120
Length of bore	cals.	93·7	90	70	40	50	50	50	40	46	45	50	45	50	45	40
Weight of gun	lb.	32 lb.	80 lb.	152 lb.	616 lb.	900 lb.	c. q. lb. 2 0 17	c. q. lb. 6 0 0	c. q. lb. 11 0 0	c. q. lb. 13 1 8	c. q. lb. 18 1 0	t. c. q. 1 2 0	t. c. q. 1 18 3	t. c. q. 2 0 0	t. c. q. 2 1 2	t. c. q. 3 1 0
" "	kgs.	14·5	36·3	69	280	408	109	305	560	677	927	1117	1968	2032	2,110	3,100
Weight of projectile	lb.	174 grs.	770 grs.	·2833	2	2·205	2·205	3·3	14·33	14·33	12·5	14·33	31	31	35·274	48·5
" "	kgs.	11·3 grms.	50 grms.	·1285	·9	1	1	1·5	6·5	6·5	5·6	6·5	14·06	14·06	16	21·9
Muzzle velocity	f.s.	2,400	2,725	2.900	2,000	2,625	2,625	2,800	2,461	2,641	2,600	2,560	2,700	2,850	2,625	2,560
" "	m s.	732	830	885	609	800	800	853	750	805	792	780	823	869	800	780
Muzzle energy	f.t.	1	5·65	16·5	55·5	105	105	180	602	695	586	650	1,565	1,740	1,685	2,205
" "	m.t.	·31	1·72	5·1	17·2	32	32	54·8	186	215	107·8	198	477	530	522	672
Rounds per minute		500–600	300–400	120	200	100	35	30	..	..	20	25	18	18	..	12
Weight of mounting (exclusive of Gun)		38 lb.	109 lb.	400 lb.	c. q. lb. 10 3 12	c. q. lb. 14 1 15	c. q. 12 3	c. q. lb. 18 2 3	t. c. q. 1 19 2	t. c. q. 2 0 3	t. c. q. lb. 1 19 3 9	t. c. q. 2 7 3	t. c. q. lb. 6 4 0 18	t. c. q. lb. 6 12 0 0	t. c. q. 4 10 3	t. c. q. lb. 9 0 1 0
" "	kgs.	17·2	49·3	181	551·5	730	647·6	941·1	2,006	2.070	2023·4	2425·8	6307·7	6706·0	4,630	9157·1
Angle of elevation	deg.	80	90	90	80	85	90	80	90	99	90	90	90	90	90	90
Angle of depression	deg.	20	10	5	5	5	0	5	0	0	5	5	5	5	5	5

BEARDMORE GUNS AND HOWITZERS.

Naval.

Calibre	ins.	4	4	4·7	4·7	4·7	5·5	5·5	5·5	6·0	6·0	7·5	8	8	9·2	12	13·5	**15**	**16**
do.	mm.	101·6	101·6	120	120	120	140	140	140	152	152	190	203·2	203·2	234	305	343	**381**	**406**
Length of Bore	cals.	50	55	50	45	52·5	55	55	40	50	52·5	45	50	55	50	50	46	**45**	**45**
Weight of Gun	tons	2·15	2·45	3·65	3·35	3·85	8·0	6·8	5·35	7·95	8·1	13·9	17·5	19·25	29	66	77	**96**	**107**
do. do.	kg.	2,184	2,489	3,711	3,405	3,911	8,128	6,910	5,435	8,077	8,230	14,122	17,780	18,542	24,402	67,056	78,232	**97,536**	**108,712**
Weight of Projectile	lbs.	31	31	50	50	48·5	92·6	82	75	100	100	200	250	250	425	950	1,350	**1,850**	**2,100**
do. do.	kg.	14·06	14·06	22·68	22·68	22	42	37·2	34	45·36	45·36	90·72	114·2	114·2	192·8	430·9	612·4	**839·2**	**952·5**
Muzzle Velocity	f.s.	2,920	3,000	2,950	2,650	3,000	2,950	3,000	2,650	2,970	3,000	2,750	2,900	3,000	2,825	2,825	2,650	**2,620**	**2,675**
do. do.	m.s.	890	914	900	808	914·4	900	914·4	808	905·2	914·4	838	884	914	861	861	808	**799**	**815**
Muzzle Energy	f.t.	1,833	1,935	3,017	2,434	3,026	5,587	5,117	3,652	6,116	6,240	10,488	14,579	15,602	23,518	52,571	63,738	**88,056**	**104,198**
do. do.	m.t.	568	599	934	837	937	1,730	1,584	1,131	1,894	1,938	3,248	4,515	4,832	7,283	16,280	20,441	**27,270**	**32,270**

		Motor Boats or Sub-marines.	Sub-marine.	Anti-Aircraft. For Sub-marines.	Anti-Aircraft. Fixed.	Anti-Aircraft. Fixed.	Anti-Aircraft. Mobile.	Anti-Aircraft. Mobile.	Tank Guns.	Tank Guns.
Calibre	ins.	3·0	4·0	3·0	3·0	4·0	3·02	3·3	1·85	2·24
do.	mm.	75	101·6	75	75	101·6	77	84	47	57
Length of Bore	cals.	45	40	45	45	45	47·5	42·5	30·0	23
Weight of Gun	ton	0·67	1·3	0·64	1·65	2·15	0·75	1·1	1·8 cwt.	5·6 cwt.
do. do.	kg.	686	1,321	648	1,675	2,185	762	1,120	90·7	284
Weight of Projectile	lbs.	12·5	31	16	16	31	17·6	21	3·25	6
do. do.	kg.	5·67	14·06	7·26	7·26	14·06	8·0	9·53	1·49	2·72
Muzzle Velocity	f.s.	2,200	2,250	2,100	2,590	2,600	2,175	2,300	1,750	1,525
do. do.	m.s.	670	685·8	640	790	792	663	701	533	465
Muzzle Energy	f.t.	419	1,088	489	744	1,453	577	770	69	96·7
do. do.	m.t.	130	337	151	230	450	179	238	21·6	30
				Semi-Auto.						

		Anti-Tank. Infantry Guns.	Anti-Tank. Infantry Guns.	Anti-Tank. Infantry Guns.	Field Guns and Howitzers. Gun.	How.	How.	How.	How.	Gun.	How.	How.	Mountain H.	Mountain H.
Calibre	ins.	1·85	1·575	2·24	3·3	4·134	3·3	4·5	6	6	8	9·2	3·3	
do.	mm.	47	40	57	84	105	84	112	152·4	152·4	203·2	234	84	
Length of Bore	cals.	28·5	37	24	31	20	15	20	13	35	17	17	12·25	
		cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	tons	tons	tons	tons	wts.	
Weight of Gun		1·03	0·92	0·92	7·25	8·0	4·28	9	1·15	3·7	3·0	4·25	4·0	
do. do.	kg.	52·4	46·7	46·7	369	406	194	458	1,168	3,759	3,048	4,318	203	
Weight of Projectile	lbs.	3·25	2·0	6·0	18·5	35·2	18·5	35		100	200	290	18·5	21·0
do. do.	kg.	1·49	0·91	2·72	8·39	16	8·39	15·88	45·36	45·36	90·72	131·5	8·39	9·53
Muzzle Velocity	f.s.	1,550	2,000	700	1,820	1,350	1,100	1,100	1,250	2,375	1,500	1,500	1,040	960
do. do.	m.s.	473	609·6	213·4	555	412	335	335·3	381	724	457	457	317	290
Muzzle Energy	f.t.	54	55	20·4	425	444	155	293·6	1,083	3,911	3,120	4,524	138	134
do. do.	m.t.	16·7	17	6·3	131	138	48	90·9	335	1,211	956	1,401	42·7	41·5
		S.A.	S.A.	S.A.										
			In same carriage.	In same carriage.						In same carriage.	In same carriage.			

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1893–96.	Model 1893–96.	Model 1893–96.	Model 1902.	Model 1902–06.	Model 1906.	Model 1906–10.	Model 1910.	Model 1912.	Model 1919.	Model 1920.	Model 1923.	Model 1924.	Model 1924.	Model 1927.
Calibre . . . cms.	19·4	16·4	16·4	19·4	24	30·5	30·5	13·8	34	13	15·5	13 8	13	20·3	13·8
Calibre . . . ins.	7·64	6·46	6·46	7·64	9·45	12·01	12·01	5·43	13·4	5·12	6·1	5·43	5·12	7·99	5·43
Length . . . cals.	40	45	45	50	49·5	45	44·67	55	45	40	50	40	40	50	40
Total weight . tons	12·48	8·1	8·09	14·94	28·8	53·23	53·16	5·22	65·23	4·32	8·73	4·05	3·81	20·39	4 61
Firing Charge, A.P. Projectile . . lbs.	74·3	43·45	45·8	84·66	147·05	287·7	277·8	23·68	334	17·05	43·21	17·86	17·05	103·12	17·86
A.P. Projectile . lbs.	199·09	121·03	121·03	199·08	487·22	970·32	952·38	80·47	1222·44	70·44	124·07	87·98	70·44	271·61	87·98
Muzzle Velocity . f.-s.	2,756	2,838	2,911	3 117	2,625	2,559	2,569	2,723	2,605	2,408	2,789	2,297	2,408	2,789	2,297

ITALIAN NAVAL ORDNANCE.

Official Designation:— Calibre mm., length cal.	305/46	254/45	254/45	203/53	203/50	190/45	152/53	152/50	152/45	120/50	120/50	120/45	102/45	100/47	102/35	76/50	76/45	76/40	76/17
Mark A. = Armstrong, V = Vickers, An. = Ansaldo. S. = Schneider.	A., V.	A.	V.	An.	S.-An.	A., V.	An.	A.	S.	An.	A., V.	A.	S. A.		S.	A., V.	S.	A.	S.
Mark O.T.O. = Odero-Term-Orlando							O.T.O.							O.T.O.					
Date of introduction.	1909	1907	1906	1929	1924	1906	1927–29	1918	1911	1926	1909	1918	1917	1929	1914–1915	1909	1911	1916	1912
Designation by calibre, cm.	30·479	25·4	25·4	20·3	20·3	19·05	15·24	15·24	15·24	12·0	12·0	12·0	10·2	10·0	10·2	7·62	7·62	7·62	7·62
Calibre in inches . . .	12	10	10	8	8	7·5	6	6	6	4·75	4·75	4·75	4	3·9	4	3	3	3	3
Lengths: Total, in feet	47·77	39·07	38·715	36·646	34·593	29·22	27·83	25·94	23·42	19·57	20·38	18·38	15·715	15·721	12·247	13·271	11·722	10·292	4·593
Lengths: Rifled Bore, in inches .	477·9	358·4	370·5	358·66	—	281·7	—	256·6	219·2	—	204·64	174·64	150·74	12·365	114·29	126	107·2	101·57	44·8
Lengths: Powder Chamber in inches	97·7	74·91	74·91	64·56	—	51·65	—	44·6	44·6	—	28·64	35·03	27·16	3·112	23·50	22	25·4	—	—
Lengths: Bore in calibres . . .	37·3	35·84	37·05	—	—	37·5	—	42·77	36·54	—	43·31	36·96	37·53	15·371	28·46	42	35·73	28·42	14·96
No. of Grooves	72	60	70	52	52	44	44	36	56	36	36	36	40	26	32	28	25–8	16	24
Twist of Rifling, in calibres	30	30	00-30	—	30	00–30	30	33	36	30	30	30	—	30	—	30	35·9	33	22
Total Weight in tons . .	62·99	34·49	35·339	19·170	20·800	14·478	7·700	8·100	7·025	3·00	3·662	4·035	2·327	2·020	1·200	1·122	0·698	0·660	0·104
Firing Charge: Armour-piercing projectile . . . lb.	346	185	185	111·994	103·19	70·987	43	—	—	—	—	—	—	—	—	—	—	—	—
Firing Charge: Common Shell, H.E., lb.	279·9	185	185	—	—	70·987	—	32·79	30·64	—	14·66	9·589	9·479	10·319	6·50	3·02	3·571	2·281	0·529
Weight: Armour-piercing projectile . . . . . lb.	997·2	494	494	275·573	260	200·39	103·5	—	—	50·5	—	—	—	—	—	—	—	—	—
Weight: Shell, H.E., lb. . . .	884·4	489·8	489·8	—	—	498·5	—	110·22	103·61	—	48·74	48·74	30·31	30·318	30·31	14·05	14·05	13·954	11·68
Weight: Shrapnel, . . . lb.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11·68
Bursting Charge: Armour-piercing projectile . . . lb.	16·63	4·37	4·37	—	—	2·332	—	—	—	—	—	—	—	—	—	—	—	—	—
Bursting Charge: Shell, H.E. . . lb.	53·13	29·86	29·86	—	—	11·706	—	5·996	7·528	—	2·711	2·711	2·866	—	2·866	1·102	1·102	—	0·782
Bursting Charge: Shrapnel, . . . lb.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·165
Muzzle Velocity in ft. secs. .	2755·9	2788·77	2788·77	3051·180	2743·20	2788·77	2786	2854	2723	2786	2788	2460	2788	2438·40	2460	2460	2460	2214	1230
Muzzle Energy: Total tons per sq. inch	18·63	17·71	17·71	—	—	17·98	—	18·37	16·86	—	18·37	15 75	18·37	—	18·37	18·37	15·75	—	12·47

305/46 A.V., "Duilio and Cesare" class; 254/45 A., "S. Giorgio" class; 254/45 V., "Pisa"; 203/53 An., 1929, "Zara" class; 203/50 S.An. "Trento" class; 190/45 A.V., "S. Giorgio and Pisa" class; 152/53 An., O.T.O., "Colleoni" class; 152/45 S. "Duilio" class; 120/50 An., "Vivaldi" class; 120/50 A.V., "Quarto" and "Cesare"; 120/45 A., "Leone"; 100/47 O.T.O. "Trento, Zara and Colleoni" class.

JAPANESE NAVAL ORDNANCE

Date and Pattern of Gun.	KM. (1)	V. (2)	A. (3)	V. (4)	A. (5)	A. (6)	V. (7)	— (8)	A. (9)	Carried by
Desig. by Calibre, in cms.	40·6	35·6	20·3	15 2	15 2	15·2	15 2	14	12	(1) Mutsu Class.
Calibre, in inches	16	14	8	6	6	6	6	5·5	4·7	(2) Ise Class. Fuso Class. Kongo Class.
Total length, in feet	..	..	..	..	..	..	..	..	..	
Length of Bore, in ins.	..	..	..	..	..	..	..	..	..	(4) Kongo.
Length of Bore, in cals.	45	45	45	50	50	45	45	50	45	(5) Fuso Class. Kongo Class (except Kongo). Yahagi. Tone.
Total weight, in tons.	..	83	17·3	8	8 7	8·5	7·5	6 25	3·3	
Weight of Firing Charge, Armour-piercing Projectile . . . lb.	..	..	..	..	..	..	..	..	..	
Weight { Armour-piercing Projectile lb.	2190	1400	250	100	100	100	100	82	45	(8) Ise Class. Mutsu Class. Kuma Class. Tenryu Class.
Weight { Common Shell ,,	..	..	..	..	..	..	..	..	..	
Muzzle Velocity, in f.-s., A.P. Projectile	2780	2526	2740	3000	3000	2130	3000	2725	2988	(9) Tone. Yodo. Mogani.
Muzzle Energy in foot-tons	118,000	62,500	13,100	6300	6300	3165	6300	4250	2810	
Perforation at Muzzle,† wrought iron, inches	65	48·2	30·5	25·5	25·5	18·3	25·5	20·8	19·2	
Perforation Krupp Steel, 3000 yds.	{13·8 at 10,970 metres}	..	10¼	6½	6½	4½	6½	..	2¼	

† By Tressider's Formula.

BETHLEHEM STEEL CO.

SHIP AND COAST-DEFENCE GUNS.

Calibre.		Length of bore.	Weight of gun, including breech mechanism.		Weight of projectile.		At Muzzle. Velocity.		At Muzzle. Energy.		At Muzzle. Penetration of steel-plate (De Marre).		Type of Ammunition.
inches.	millimetres.	calibres.	lbs.	kgs.	lbs.	kgs.	ft. per sec.	metres per sec.	foot-tons.	metre-tons.	inches.	milli-metres.	
1·457	37	about {50	160	72·5	1·07	0 48	2,150	655	34	10·5	2·04	51·8	Fixed in cartridge case.
1·850	47	about {50	550	249·5	3·3	1·5	2,400	732	132	41	4·11	104·4	,, ,,
2·244	57	50	960	435·5	6 07	2 75	2,400	732	243	75	5·17	131·3	,, ,,
3	76	50	1950	884·5	13	5·9	2,700	823	658	204	7·71	195·8	,, ,,
			tons.										
4	102	50	2·6	2,642	33	15	2,800	853	1,795	557	11·61	294·9	,, ,,
4	102	50	2·6	2,642	30 86	14	3,000	914	1,928	597	12·22	310·4	,, ,,
5	127	51	5·0	5,080	50	22·7	3,150	960	3,440	1,067	14·56	369·8	Separate, with powder in bag.
6	152	45	7·0	7,112	105	47·6	2,600	792	4,926	1,523	15·47	392·9	Separate, with cartridge case.
6	152	50	8·4	8,534	105	47·6	2,800	853	5,718	1,767	17·19	436·6	Separate, with powder in bag.
6	152	53	10 1	10,260	105	47 6	3,000	914	6,559	2,028	18 97	481·8	,, ,, ,,
7	178	45	12·7	12,900	165	74·8	2,700	823	8,348	2,584	19·11	485·4	,, ,, ,,
7	178	50	14·5	14,730	165	74·8	2,900	884	9,631	2,982	21·16	537·5	,, ,, ,,
8	203	45	18·6	18,900	260	118	2,800	853	14,148	4,379	24·15	613·4	,, ,, ,,
8	203	50	22·3	22,660	260	118	2,900	884	15,177	4,703	25·38	644·6	,, ,, ,,
9·2	234	50	30·4	30,890	380	172	2,900	884	22,181	6,856	28·66	727 9	,, ,, ,,
10	254	45	35·4	35,970	515	234	2,800	853	28,023	8,685	30·97	786 6	,, ,, ,,
10	254	50	43·9	44,600	515	234	2,900	884	30,061	9,327	32 56	827·0	,, ,, ,,
12	305	45	53·8	54,660	870	395	2,800	853	47,341	14,660	37·05	941·1	,, ,, ,,
12	305	50	57·5	58,400	870	395	2,900	884	50,783	15,745	38·95	989·3	,, ,, ,,
14	356	45	64·6	65,650	1,400	635	2,600	792	65,687	20,317	39·69	1008·0	,, ,, ,,
14	356	50	79·4	80,700	1,400	635	2,800	853	76,181	23,567	44 12	1121	,, ,, ,,
15	381	45	86·5	87,880	1,700	771	2,600	792	79,763	24,668	42·35	1076	,, ,, ,,
16	406	45	105·0	106,500	2,100	953	2,600	792	98,530	30,491	45·95	1167	,, ,, ,,
16	406	50	128 0	130,200	2,100	953	2,800	853	114,272	35,369	51·08	1297	,, ,, ,,
16	406	50	140·0	142,400	2,330	1,057	2,700	823	117,900	36,500	52·39	1331	,, ,, ,,
18	457	45	150 0	152,400	3,330	1,510	2,450	747	138 734	42,979	51·71	1318	,, ,, ,,

Guns of 4·7-in. calibre and under, equipped with the wedge-type breech mechanism, are supplied with an automatic breech-opening device, if desired.

UNITED STATES NAVAL ORDNANCE.

GUN.	MARK.	Length in Calibres.	Total Length	Capacity of Chamber in Cubic Inches.	Travel of Projectile in Inches.	Weight of Gun.	Weight of Projectile.	Weight of Charge.	Muzzle Velocity.	Muzzle Energy.	Penetration at Muzzle, Krupp Armour, using Capped-Projectile.
			inch.			tons.	lb.	lb.	ft.-seconds.	ft.-tons.	inch.
3-in. S.A.	V., VI.	50	159	219	128·3	1·0	13	3·85	2700	658	3·3
4-in. R.F.G.	III., IV., V., VI.	40	164	331	134·5	1·5	33	4·85	2000	915	3·4
4-in. R.F.G.	VII.	50	205	652	168·3	2·6	33	9·0	2500	1,430	4·6
4-in. R.F.G.	VIII.‡	50	205	652	168·3	2·9	33	12·3	2800	1,794	5·3
5-in. R.F.G.	II., III., IV.	40	206	656	167·8	3·1	50	10·0	2300	1,845	5·3
5-in. B.L.R.	V., VI.	50	256	1,200	215·6	4·6	60	19·2	2700	3,032	6·2
5-in. B.L.R.	VI.	50	256	1,200	215·6	4·6	50	20·5	3000	3,122	6·4
5-in. R.F.G.	VII.†	51	261	1,135	215·6	5·0	50	23·8	3150	3,439	6·8
6-in. R.F.G.	II., III.	30	196	1,318	145·4	4·8	105	18·8	1950	2,768	5·3
6-in. R.F.G.	IV., VII.	40	256	1,320	205·8	6·0	105	18·8	2150	3,365	6·0
6-in. R.F.G.	IX.	45	270	1,320	221·7	7·0	105	18·8	2250	3,685	6·3
6-in. B.L.R.	VI.	50	300	2,101	247·5	8·3	105	30·0	2600	4,920	8·0
6-in. B.L.R.	VIII.	50	300	2,101	247·5	8·6	105	37·0	2800	5,707	8·3
7-in. B.L.R.	II.	45	323	3,643	259·8	12·7	165	58·0	2700	8,338	9·6
8-in. B.L.R.	III., IV.	35	305	3,170	245·8	13·1	260	43·8	2100	7,948	8·6
8-in. B.L.R.	V.	40	343	5,243	273·1	18 1	260	78·0	2500	11,264	10·6
8-in. B.L.R.	VI.	45	369	5,243	299·1	18·7	260	98·5	2750	13,360	12·0
10-in. B.L.R.	I., II.	30	329	6,779	251·1	25·1	510	90·0	2000	14,141	10·7
10-in. B.L.R.	III.	40	413	10,222	327·0	34·6	510	207·5	2700	25,772	15·6
12-in. B.L.R.	I., II.	35	441	11,991	345·2	45·3	870	160·0	2100	26,596	14·2
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	237·5	2400	34,738	16·8
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	305·0	2600	40,768	18·5
12-in. B.L.R.	V.	45	553	16,974	452·0	52·9	870	305·0	2700	43,964	19·4
12-in. B.L.R.	VI.	45	553	14,970	452·0	53·6	870	340·0	2850	48,984	20·8
12-in. B.L.R.	VII.	50	607	14,296	506·3	56·1	870	340·0	2950	52,483	21·7
13-in. B.L.R.	I., II.	35	479	15,068	374·9	61·4	1130	180·0	2000	31,333	15·0
14-in. B.L.R.	I.	45	642	..	..	63·6	1400	365·0	2600	65,606	39·7*
14-in. B.L.R.	II.	50	700	..	..	82·2	1400	..	2800	76,180	44·1
16-in. B.L.R.	..	45	..	..	..	105 0	2100		2006	98,500	45·95
16-in. B.L.R.	..	50	..	..	..	130·0	2100		2800	114,270	51·08

* De Marre formula.

† All battleships from the Delaware class onward have this gun for torpedo defence.

‡ There is now a 4-in. 50-cal. anti-aircraft gun.

The U.S. Navy has a 5-in. 25-calibre **A.A.** gun; a 6-in. 53-calibre gun; and an 8-in. 55-calibre gun, but complete details are not yet published.

SIZE AND FIGHTING QUALITIES OF BRITISH CAPITAL SHIPS OF DIFFERENT PERIODS.

Name.	Date of Completion.	Displacement.	Side Armour.	Speed.	Total Weight of Shot in One Round.	Collective Energy at Muzzle of One Round.
		tons.	in.	knots.	lb.	foot-tons.
Warrior	1861	9,210	4½-in. wrought-iron	14½	3,800	61,476
Hercules	1868	8,680	9-in. to 6-in. wrought-iron	14	5,400	70,200
Alexandra	1877	9,490	12-in. to 6-in. wrought-iron	15	5,426	71,400
Inflexible	1881	11,880	24-in. to 16-in. wrought-iron	13	6,936	123,120
Benbow	1888	10,600	18-in. compound	16·75	4,600	135,560
Royal Sovereign	1892	14,150	18-in. and 5-in. compound	17·5	5,800	159,810
Barfleur	1894	10,500	12-in. compound	18·5	2,450	67,670
Canopus	1900	12,950	6-in. hardened steel	18·25	4,600	178,720
Prince of Wales	1902	15,000	9-in. super-hardened steel	18·25	4,600	194.400
King Edward VII.	1905	16,350	9-in. hardened steel	19	6,100	271,800
Dreadnought	1906	17,900	11-in. hardened steel	21	8,800	487,100
Neptune	1911	20,600	12-in. hardened steel	21·5	8,900	545,000
Ajax	1913	25,000	12-in. hardened steel	21·5	14,500	625,000
Queen Elizabeth	1915	27,500	13-in. hardened steel	25	15,360	638.400
Royal Sovereign	1916	25,750	13-in. hardened steel	23	15,360	638,400
Hood	1920	41,200	13-in. hardened steel	31	15,360	638,400
Nelson	1927	35,000	13-in. hardened steel	23	18,432	847,458

PARTICULARS OF SUCCESSIVE LARGE BRITISH NAVAL GUNS, 1800 TO 1928

Year.	Type.	Weight.		Length.	Calibre.	Weight of Projectile.	Weight of Charge.	Muzzle Energy.	Penetration of Wrought-iron at 1000 yards range
		tons.	cwt.	in.	in.	lb.	lb.	ft.-tons.	in.
1800	Cast-iron smooth-bore . .	2	12	114	6·4	32	10	400	—
1842	Ditto	4	15	—	8·12	68	16	700	—
1865	Woolwich wrought-iron .	4	10	—	7	115	22	1,400	7
1870	Built-up muzzle-loader . .	38	0	200	12·50	810	200	13,900	17
1880	Ditto	80	0	321	16	1700	450	27,960	22½
1887	Built-up breech-loader . .	110	10	524	16·25	1800	960	54,390	32
1895	Wire-wound breech-loader .	46	0	445·5	12	850	—	33,940	34·6
1900	Ditto	51	0	496·5	12	850	210	36,290	35·4
1905	Ditto	58	0	558	12	850	—	47,700	46·2
1912	Ditto	76	0	626	13·5	1400	297	60,237	*50
1914 to 1920	Ditto	100	0	650	15	1920	428	79,800	*56
1921	Ditto	117	0	720	16	2240	—	93,230	*57
1928	Ditto	108	0	742	16	2048	498	94,162	*60

* At muzzle. Guns of 18-in. calibre were fitted to one cruiser during the War, but were subsequently removed and used in monitors.

FOREIGN NAVAL AIRCRAFT TYPES.

United States Naval Air Service.

Maker, Number, Name.	Type, Number of Seats.	Engine H.P. Make.	Max. speed, m.p.h.	Ceiling, in feet.
Naval A/C Factory. PN–12.	Patrol Flying Boat. Crew of 5.	Two 525 "Cyclone."	144	11,000
Boening. F4B.	Single-seater Fighter.	500 "Wasp."	175	21,500
Curtiss. F7C–1. "Seahawk."	Single-seater Fighter.	425 "Wasp."	155	—
Curtiss. F8C–4. "Helldiver."	Two-seater Fighter. Light Bomber.	450 "Wasp."	141	20,500
Curtiss. N2C–2. "Fledgling."	Two-seater Training.	240 "Whirlwind."	113	17,000
Douglas. PD–1.	Coastal Patrol Flying Boat. Crew of 4.	Two 525 "Cyclone"	121	11,600
Douglas. T2D–1.	Torpedo Bomber and G.P. Seaplane. Three-seater.	Two 525 "Cyclone."	—	—
Boening. OL–8.	Amphibian. Two-seater.	425 "Wasp."	124 Range 650 miles.	
Martin. T4M–1.	Torpedo Bomber and G.P. Three-seater.	525 "Hornet."	116	9,600
Martin. XT5M–1. Diving Bomber.	High performance Bomber. Two-seater.	525 "Hornet."	140	18,000
Vought. 02U. "Corsair."	Two-seater land, sea, or Amphib. Fighter.	425 "Wasp."	150	24,500

All engines are air-cooled. "Wasp" and "Hornet" engines are made by Pratt and Whitney. "Whirlwind" and "Cyclone" engines are made by Wright.

The "Los Angeles" (LZ–126) was built by Zeppelin Co., of Friedrichshafen, and flown across the Atlantic (October, 1924) by a German crew for delivery to the United States. The "ZM–2" was manufactured by the Aircraft Development Corporation, and delivered to the U.S. Navy in September, 1929. She is used at Lakehurst for training.

"The Akron," built by the Goodyear Zeppelin Corporation, was delivered to the U.S. Navy in the summer of 1931. She has accommodation for five scouting aircraft, and is provided with hooks for the aircraft to return to the airship. The "ZRS–5," similar to the "Akron," is under construction by the Goodyear Co. The two airships are costing £1,600,000 each.

United States—*continued.*

The United States have the following shore naval bases:—Pensacola, Florida (Training); San Diego, California (Fleet Base); Hampton Roads, Virginia (Fleet Base); Lakehurst, New Jersey (Lighter-than-air craft); Pearl Harbour, Hawaii (Fleet Base); Coco-Solo, Canal Zone (Fleet Base); Anacostia, Columbia (Experimental); Seattle, Washington (Reserve Training Base).

Japanese Naval Air Service.

The types of aircraft in use are given as: Navy type 10 Fighter; Navy type 10 Reconnaisance; Navy types 13, 14 and 15 Seaplanes; F5 Patrol Flying Boat; Navy type 15 Flying Boat; and "Avro" Landplane for training.

The following further information is reported, though no further details are available: (*a*) A British single-seater fighter is in use. (*b*) The licence for the manufacture of the "Short" flying boat has been purchased. (*c*) The three-seater torpedo bomber is also used as a general purpose aircraft. (*d*) All the flying boats are fitted with D/F.

Lighter-than-air craft are based on Kasumigaura. There is one airship built in Japan in 1929 which is reported to be of 7,000 cubic metres capacity and 250 feet long. They also have two "Blimps."

French Naval Air Service.

Lighter-than-air craft activities received a severe set back when the "Dixmude" (ex-German L27) was lost with all hands off the coast of Sicily on December 20, 1923. The French Navy is now developing two classes of airship, the "Videttes" and the "Escorteurs." The "Videttes," of which there are nine, are of about 125,000 cubic feet capacity, speed of about 40 m.p.h., a crew of four, and endurances varying from 15 to 25 hours. The "Escorteurs," of which there are four, are of about 350,000 cubic feet, have a speed of about 40 m.p.h., a crew of six, and an endurance of about 40 hours.

The bases and aerodromes of the Naval Air Service are as follows:

1st Region (Cherbourg).—Chantereyne (Escad. 1B1, Seaplanes); Querqueville (Landplanes and Captive Balloons).

2nd Region (Brest).—Lanion (Escad. 2S1, Seaplanes); Brest (Captive Balloons); Rochefort (Training); Hourtin (Training).

3rd Region (Toulon).—St. Raphael (Experimental); Berre (Escads. 3B1, 3B2, Seaplanes, and 3S1 Flying Boats); Hyeres (Landplanes), 3C1.

4th Region (Bizerta).—Karouba (Escads. 4B1, 4B2, 4S1, Seaplanes); Bizerta (Captive Balloons); Bizerte-Sidi-Ahmed (Escads. 4B3, 4C1, Landplanes).

French Naval Air Service—*continued.*

Maker, Number, Name.	Type, Number of Seats.	Engine H.P. Make.	Max. Speed, m.p.h.	Ceiling, in feet.
C.A.M.S. 46E.	Two-seater Training. Flying Boat.	140 "Hispana Suiza."	97	—
C.A.M.S. 37A.	Three-seater Recon. Amphib. or Flying Boat.	450 or 500 Geared "Lorraine" W. Pusher Airscrew.	104	4,500
C.A.M.S. 55	Bomber or Recon. Flying Boat.	Two 600 Geared "Hispana Suiza" or two 480 "Gnome Rhone Jupiter."	130	14,700
C.A.M.S.	50. As for 55, but fitted for carrying a Torpedo.			
C.A.M.S. 60.	Torpedo Bomber Seaplane.	Two 450 "Gnome Rhone Jupiter."	124	16,400
Dewoitine D27C1.	Single-seater Fighter.	500 "Hispana Suiza."	192	30,000
Farman "Goliath" F65.	Torpedo Bomber Seaplane.	Two 380 "Gnome Rhone Jupiter."	100 Range 465 miles at cruising speed.	14,500
Farman "Goliath." F160.	Torpedo Carrier Seaplane.	Two 500 "Farman" Geared, 12 W.E.	112	4,500
Lavasseur V.A.M. BC2.	Two-seater Fighter.	450 "Lorraine" or "Hispana Suiza."	124	20,000
Levasseur 4R3B.	Three-seater Observation.	450 "Lorraine" W.	108 Endurance, 5 hours at cruising speed.	16,500
Levasseur 7T2B.	Three-seater Torpedo Bomber.	550 "Farman" or 580 Geared "Renault."	Endurance, 5 hours at cruising speed.	
Levasseur 1OR3B.	Three-seater Reconnaissance.	600 "Hispana Suiza."	123	Fitted with brake to lock airscrew horizontal for landing.
Nieuport Delage 62C1	Single-seater Fighter.	550 "Hispana Suiza."	168	27,000
Romano R4	Two-seater Central Recon. Seaplane.	230 "Salmson" A.B.9 Four-Bladed Air-screw.	115	—

Italian Naval Air Service.

Lighter-than-air craft do not exist in Italy, and all experiments and research were abandoned after the disaster to General Nobile in the Italia in 1928, while making an attempt to fly over the North Pole.

Maker, Number, Name.	Type, Number of Seats.	Engine H.P. Make.	Max. Speed, m.p.h.	Ceiling. Endurance in hours.
Macchi. M7ter.	Single-seater Fighter	260 "Isotta Fraschini" V6.	124	21,300 3
Macchi. M41bis.	Single-seater Fighter.	610 "Fiat" A20	160	21,300 2½–3
Fiat. CR20. Seaplane.	Single-seater Fighter. All metal.	410 "Fiat" A20.	168	26,500 3
Savoia. S59. Flying Boat.	Two-seater Reconnaissance.	400 "Lorraine."	115	13,500 4
Savoia. S59. Flying Boat.	Two-seater Reconnaissance.	500 "Isotta Fraschini" (Asso.).	130	14,000 4
Savoia. S55. Monoplane Flying Boat	Three-seater Twin Hull Reconnaissance or Bomber.	Two 500 "Isotta Fraschini."	121	10,500 3½
Macchi. M18. Flying Boat.	Two-seater Reconnaissance.	200–250 "Isotta Fraschini" Semi (Asso.).	107	12,500 4

Italy does not at present use any supercharged engines in her Flying Services. Heavy oil engines for aircraft are being experimented with, and successful flights with them have been carried out from 1930 onwards. Such engines being manufactured by Fiat. The wearing of parachutes of the "Salvator" type is compulsory for all occupants of Service Aircraft. Nearly all aircraft carry W/T transmitting and receiving sets, and a few are fitted with R/T.

MERCHANT SHIPPING REFERENCE SECTION.

BRITISH AND IRISH MERCHANT TONNAGE, AND UNITED STATES SEA-GOING MERCHANT TONNAGE, AS COMPARED WITH THE WORLD'S TOTAL MERCHANT FLEET.

Year.	World.	Great Britain and Ireland.	Percentage of British and Irish Tonnage to Total.	United States.*	Percentage of United States Tonnage to Total.
	Tonnage.	Tonnage.		Tonnage.	
1890	21,118,528	10,241,856	48·5	†	—
1891	22,912,753	10,585,747	46·2	†	—
1892	23,672,698	11,157,662	47·1	1,926,426	8·1
1893	24,236,865	11,563,997	47·7	1,964,359	8·1
1894	24,547,597	11,807,010	48·1	2,171,459	8·8
1895	25,086,199	12,117,957	48·3	2,164,753	8·6
1896	25,593,186	12,293,539	48·0	2,234,725	8·7
1897	25,889,044	12,403,409	47·9	2,326,838	9·0
1898	26,543,360	12,587,904	47·4	2,448,677	9·2
1899	27,613,851	12,926,924	46·8	1,872,245	6·8
1900	28,957,358	13,241,446	45·7	2,035,062	7·0
1901	30,479,971	13,656,161	44·8	2,231,925	7·3
1902	32,302,412	14,431,072	44·7	2,342,913	7·3
1903	33,501,855	14,889,571	44·4	2,480,981	7·4
1904	34,786,132	15,391,350	44·2	2,590,349	7·4
1905	35,998,180	15,803,180	43·9	2,649,411	7·4
1906	37,550,477	16,381,850	43·6	2,672,042	7·1
1907	39,435,788	16,999,668	43·1	2,728,711	6·9
1908	40,920,551	17,318,351	42·3	2,802,387	6·8
1909	41,447,825	17,377,936	41 9	2,791,282	6·7
1910	41,912,520	17,516,479	41·8	2,761,605	6·6
1911	43,144,909	17,872,697	41·4	2,808,684	6·5
1912	44,600,677	18,213,620	40·8	2,848,829	6·4
1913	46,970,113	18,696,237	39·8	2,998,457	6·4
1914	49,089,552	19,256,766	39·2	2,970,284	6·0
1915	49,261,769	19,541,368	39·7	3,522,933	7·1
1916	48,683,136	19,134,857	39·3	3,790,578	7·8
1917†	—	—	—	—	—
1918†	—	—	—	—	—
1919	50,919,273	16,555,471	32·5	10,782,170	21·2
1920	57,314,065	18,330,424	32·0	13,789,874	24·0
1921	61,974,653	19,571,554	31·6	14,697,088	23·7
1922	64,370,786	19,295,637	30·0	14,738,506	22·9
1923	65,166,238	19,281,549	29·6	14,597,035	22·4
1924	64,023,567	19,105,838	29·8	13,530,544	21·1
1925	64,641,418	19,440,711	30·1	12,948,632	20·0
1926	64,784,370	19,399,797	29·9	12,364,668	19·1
1927	65,192,910	19,309,022	29·6	12,070,050	18·5
1928	66,954,659	19,875,350	29·6	11,997,441	17·9
1929	68,074,312	20,166,331	29·6	11,835,176	17·4
1930	69,607,644	20,438,444	29·4	11,388,367	16·4
1931	70,131,040	20,302,905	28·9	10,998,606	15 7

* Excluding American Great Lakes vessels.

† Figures not available.

NOTE.—Prior to 1919 the tonnages shown are the totals of gross tonnage for steam and motor vessels, and *net* tonnage for sailing vessels; in 1919 and subsequent years the figures are given in gross tonnage throughout.

NUMBER AND GROSS TONNAGE OF THE VESSELS OF 100 TONS
TO EACH OF THE SEVERAL COUNTRIES OF THE

Flag.	June, 1913.†		June, 1919.		June, 1922.	
	No.	Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	9,214	18,696,237	7,964	16,555,471	8,849	19,295,637
British Dominions .	2,073	1,735,306	2,141	2,052,404	2,472	2,746,883
British Empire . .	11,287	20,431,543	10,105	18,607,875	11,321	22,042,520
United States of America: Sea . .	2,696	2,998,457	4,350	10,782,170	4,886	14,738,506
Lakes . .	627	2,382,690	506	2,257,786	495	2,247,690
Philippine Islands .	77	46,489	73	51,817	99	76,264
Total .	3,400	5,427,636	4,929	13,091,773	5,480	17,062,460
Argentine	308	214,835	215	154,441	216	181,555
Austria-Hungary . .	427	1,011,414	339	714,617	—	—
Belgium	172	304,386	152	313,276	275	579,477
Brazil	459	329,637	428	512,675	399	492,571
Chili	131	139,792	114	101,647	126	131,401
China	66	86,690	102	132,515	134	188,388
Cuba	59	61,536	51	47,295	65	62,677
Denmark	811	762,054	645	702,436	822	1,038,138
Esthonia	—	—	—	—	98	45,259
Finland	—	—	338	180,962	352	213,671
France	1,552	2,201,164	1,440	2,233,631	2,094	3,845,792
Germany	2,321	5,082,061	1,768	3,503,380	1,723	1,887,408
Greece	442	722,782	312	323,796	379	668,127
Holland	759	1,309,849	931	1,591,911	1,164	2,632,713
Italy	1,114	1,521,942	858	1,370,097	1,413	2,866,335
Japan *	1,037	1,500,014	1,418	2,325,266	2,026	3,586,918
Jugo-Slavia	—	—	‡	‡	‡	‡
Latvia	—	—	—	—	67	40,124
Norway	2,191	2,457,890	1,629	1,857,829	1,852	2,600,861
Peru	60	45,514	63	79,342	74	101,209
Portugal	208	120,579	227	261,212	286	285,878
Roumania	33	45,408	35	63,792	31	72,297
Russia	1,216	974,178	618	541,005	—	—
Spain	607	840,995	576	750,611	973	1,282,757
Sweden	1,436	1,047,270	1,263	992,611	1,345	1,115,375
Turkey	272	157,298	161	116,249	—	—
Other Countries and flag not recorded .	158	98,115	495	304,530	1,167	1,270,564
Total	30,591	46,970,113	29,255	50,919,273	33,935	64,370,786

* Japanese sailing vessels are not recorded in Lloyd's Register Book.

† In 1913 the figure shown is the total of the gross tonnage of steam and motor vessels, and the *net* tonnage of sailing vessels; in 1919 and subsequent years the figure is given in gross tons throughout.

‡ Figures included in total for "Other countries."

GROSS AND UPWARDS (STEAM, SAIL, AND MOTOR) BELONGING
WORLD, AS RECORDED IN LLOYD'S REGISTER.

June, 1926.		June, 1929.		June, 1930.		June, 1931.	
No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
8,369	19,399,797	8,172	20,166,331	8,238	20,438,444	8,157	20,302,905
2,477	2,870,327	2,507	2,949,816	2,516	2,943,170	2,529	3,077,094
10,864	22,270,124	10,679	23,116,147	10,754	23,381,614	10,686	23,379,999
4,001	12,364,668	3,696	11,835,176	3,530	11,388,367	3,313	10,998.606
529	2,433,049	576	2,541,938	575	2,558,479	574	2.545,341
97	81,044	111	104,908	118	98,962	120	98,236
4,627	14,878,761	4,383	14,482,022	4,223	14,045,808	4,007	13,642,183
242	234,848	311	296,236	335	323,025	340	327,980
—	—	—	—	—	—	—	—
225	507,473	244	529,043	243	553,037	238	547,470
381	482,308	391	560,680	388	558,777	311	498,789
138	179,712	119	154,563	131	193,131	116	184,298
201	299,806	218	319,224	216	319,315	234	333,256
72	61,735	66	45,270	‡	‡	59	42,721
771	1,081,146	701	1,055,867	705	1,088,006	717	1,145,257
115	49,025	116	60,383	126	72,089	137	93,397
363	232,792	348	298,323	355	313,143	318	312,097
1,769	3,490,606	1,662	3,378,663	1,651	3,530,879	1,653	3,566,227
1,986	3,110,918	2,127	4,092,552	2,157	4,229,235	2,171	4,254,601
46[illegible]	924,944	516	1,266,685	546	1,390,899	539	1,397,782
1,109	2,564,904	1,339	2,939,067	1,401	3,086,315	1,429	3,118,170
1,401	3,240,630	1,380	3,284,660	1,380	3,331,226	1,347	3,335,673
2,087	3,967,617	2,059	4,186,652	2,060	4,316,804	1,969	4,276.341
137	195,787	153	281,396	161	302,481	181	361,606
87	67,783	108	150,159	125	195,527	127	206,686
1,844	2,841,905	1,807	3,224,493	1,916	3,668,289	1,990	4,065,506
46	79,068	38	62,160	39	64,345	39	64,686
285	280,116	269	246,368	272	265,265	261	276,357
37	68,173	34	68,647	35	68,650	31	65,921
370	323,284	379	440,506	347	532,096	386	603,836
924	1,163,008	877	1,161,591	891	1,231,737	842	1,227,370
1,380	1,338,089	1,385	1,510,125	1,417	1,623,938	1,428	1,704,669
174	136,796	189	172,096	190	177,199	190	179,287
468	637,799	584	690,734	649	744,814	598	918,875
32,615	64,784,370	32,482	68,074,312	32,713	69,607,644	32,344	70,131,040

* Japanese sailing vessels are not recorded in Lloyd's Register Book.
‡ Figures included in total for "Other Countries."

NUMBERS OF STEAMERS AND MOTORSHIPS OWNED BY THE PRINCIPAL MARITIME COUNTRIES ON JUNE 30, 1931, BY DIVISIONS OF AGE.

Country.	Numbers of Vessels owned of Various Ages.						Total Number of Vessels owned.	Percentage of Total Number of Ships under 5 years old.
	Under 5 years.	5 years and under 10 years.	10 years and under 15 years.	15 years and under 20 years.	20 years and under 25 years.	25 years and over.		
Gt. Brit. & Ireland	1,271	1,141	1,631	1,206	811	1,721	7,781	16·3
British Dominions	323	315	366	254	306	595	2,159	15·0
United States * .	136	136	1,575	218	188	476	2,729	5·0
Denmark . . .	86	123	162	73	54	179	677	12·7
France	137	174	439	176	214	381	1,521	9·0
Germany . . .	267	425	416	261	265	517	2,151	12·4
Holland . . .	298	189	293	262	132	236	1,410	21·1
Italy	99	126	223	107	121	425	1,101	9·0
Japan	199	222	770	179	137	462	1,969	10·1
Norway . . .	338	250	474	223	212	484	1,981	17·1
Spain	73	47	220	48	46	337	771	9·5
Sweden . . .	85	94	217	135	138	670	1,339	6·3
Other Countries .	388	200	541	373	471	1,851	3,824	10·1
World Total* .	3,700	3,442	7,327	3,515	3,095	8,334	29,413	12·6

* Excluding American Great Lakes vessels.

NUMBERS OF STEAMERS AND MOTORSHIPS OWNED BY THE PRINCIPAL MARITIME COUNTRIES ON JUNE 30, 1931, BY DIVISIONS OF GROSS TONNAGE.

Country.	Numbers of Vessels Owned of Various Gross Tonnages.										Total Number of Vessels owned.	Percentage of Total Number of Vessels of 6000 gross tons and over.
	100 tons and under 500 tons.	500 tons and under 1000 tons.	1000 tons and under 2000 tons.	2000 tons and under 4000 tons.	4000 tons and under 6000 tons.	6000 tons and under 8000 tons.	8000 tons and under 10,000 tons.	10,000 tons and under 15,000 tons.	15,000 tons and under 20,000 tons.	20,000 tons and over.		
Gt. Brit. & Ireland	3,362	671	726	742	1,291	567	197	137	53	35	7,781	12·7
British Dominions	1,047	301	367	253	120	45	11	12	3	—	2,159	3·3
United States * .	625	150	177	482	664	461	111	44	7	8	2,729	23·1
Denmark . . .	204	83	219	99	42	14	12	4	—	—	677	4·4
France	666	115	156	250	184	65	50	24	6	5	1,521	9·9
Germany . . .	996	297	260	221	165	127	53	17	6	9	2,151	9·9
Holland . . .	689	70	155	200	108	109	55	14	8	2	1,410	13·3
Italy	343	89	95	198	231	105	22	8	2	8	1,101	13·2
Japan	732	213	241	373	257	100	34	16	3	—	1,969	7·8
Norway . . .	742	193	425	220	218	126	42	14	1	—	1,981	9·2
Spain	351	78	89	188	45	10	3	7	—	—	771	2·6
Sweden . . .	594	175	360	115	64	14	11	2	3	1	1,339	2·3
Other Countries .	1,503	531	625	698	357	63	32	15	—	—	3,824	2·9
World Total * . .	11,854	2,966	3,895	4,039	3,746	1,806	633	314	92	68	29,413	9·9

* Excluding American Great Lakes vessels.

NUMBER AND TONNAGE OF MOTORSHIPS (EXCLUDING VESSELS FITTED WITH AUXILIARY MOTORS) OWNED BY VARIOUS NATIONS.

	June, 1923.		June, 1925.		June, 1927.		June, 1930.		June, 1931.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Gt. Brit. & Ireland	139	374,873	220	733,734	291	1,167,301	453	2,246,166	490	2,511,777
British Dominions	44	14,084	69	37,272	100	94,959	167	174,939	204	206,690
United States * .	97	139,786	132	216,889	188	349,786	258	600,453	274	660,166
Denmark . . .	40	132,542	56	171,964	68	219,246	89	341,509	105	395,122
France . . .	34	27,958	27	34,824	26	34,377	46	139,186	60	179,548
Germany . . .	45	84,528	78	233,612	112	315,141	183	537,261	198	579,478
Holland . . .	52	66,577	64	124,262	85	192,807	272	534,373	335	667,504
Italy	34	61,374	41	124,901	64	363,822	112	494,709	123	535,224
Japan	20	4,375	42	41,376	73	99,290	157	385,097	183	492,871
Norway . . .	130	177,071	156	324,567	197	580,551	292	1,279,847	345	1,628,209
Spain	8	13,378	17	18,442	25	45,927	47	117,940	57	157,804
Sweden . . .	103	173,697	120	259,900	119	295,646	143	459,099	151	518,610
Other countries .	73	45,688	88	67,501	120	207,718	244	472,960	289	590,250
World's total *.	819	1,315,931	1,110	2,389,244	1,468	3,966,571	2,463	7,783,539	2,814	9,123,253

* Excluding American Great Lakes vessels.

STEAMSHIP AND MOTORSHIP TONNAGE (INCLUDING AUXILIARIES) OWNED BY VARIOUS COUNTRIES, AS AT JUNE, 1931

Country.	Steamships.			Motorships.		
	No.	Gross tonnage.	Percentage of total steamship and motorship tonnage.	No.	Gross tonnage.	Percentage of total steamship and motorship tonnage.
Gt. Britain and Ireland	7,217	17,666,223	87·5	564	2,527,454	12·5
British Dominions .	1,861	2,703,147	92·1	298	230,492	7·9
British Empire . .	9,078	20,369,370	88·1	862	2,757,946	11·9
United States * . .	2,428	9,682,507	93·5	301	673,570	6·5
Denmark	494	722,668	63·8	183	410,533	36·2
France	1,424	3,325,376	94·7	97	187,803	5·3
Germany	1,689	3,598,543	85·2	462	627,507	14·8
Holland	962	2,426,411	78·0	448	684,946	22·0
Italy	907	2,716,776	83·0	194	556,749	17·0
Japan	1,672	3,763,925	88·0	297	512,416	12·0
Norway	1,582	2,423,926	59·7	399	1,637,703	40·3
Spain	665	1,044,714	86·2	106	167,103	13·8
Sweden	1,056	1,139,221	67·9	283	539,555	32·1
Other countries . .	3,391	5,674,863	89·9	433	640,431	10·1
World's Total* .	25,348	56,888,300	85·8	4,065	9,396,262	14·2

* Excluding American Great Lakes vessels

NUMBER AND GROSS TONNAGE OF MOTORSHIPS OF OVER 8,000 TONS GROSS, OWNED BY VARIOUS NATIONS, AS AT JUNE, 1931.

Country.	8,000 and under 10,000 tons gross.		10,000 and under 15,000 tons gross.		15,000 tons gross and above.		Total over 8,000 tons gross.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Great Britain and Ireland . . .	52	461,211	20	229,103	12	233,593	84	923,907
British Dominions.	4	35,181	5	57,373	1	19,086	10	111,640
United States . .	21	186,086	6	66,008	—	—	27	252,094
Denmark . . .	8	69,540	2	20,510	—	—	10	90,050
France	2	18,122	2	21,607	3	58,921	7	98,650
Germany . . .	7	63,647	5	66,717	2	33,431	14	163,795
Holland. . . .	24	207,519	6	68,604	5	87,833	35	363,956
Italy	7	62,154	3	36,887	3	80,560	13	179,601
Japan	11	97,946	5	58,720	3	51,448	19	208,114
Norway . . .	38	339,972	2	24,413	—	—	40	364,385
Russia	2	16,432	—	—	—	—	2	16,432
Spain	—	—	3	34,911	—	—	3	34,911
Sweden . . .	11	96,328	1	10,014	4	68,651	16	174,993
Other countries .	14	123,431	7	82,426	—	—	21	205,857
World's Total .	201	1,777,569	67	777,293	33	633,523	301	3,188,385

NUMBER AND TONNAGE OF TANKERS OWNED BY VARIOUS NATIONS.*

	June, 1923.		June, 1925.		June, 1927.		June, 1929.		June, 1930.		June, 1931.	
	No.	Tons gross.	No.	Tons gross.	No.	Tons gross.	No.	Tons gross.	No.	Tons gross.	No.	Tons gross.
Great Britain and Ireland	312	1,691,257	315	1,708,978	352	1,934,186	388	2,165,208	380	2,167,297	405	2,353,327
British Dominions	39	196,639	34	185,836	34	181,041	39	227,969	39	235,098	48	268,983
British Empire	351	1,887,896	349	1,894,814	386	2,115,227	427	2,393,177	419	2,402,395	453	2,622,310
United States	399	2,497,625	374	2,281,324	374	2,293,539	381	2,374,358	389	2,419,977	394	2,513,070
Belgium	7	36,471	7	34,982	6	39,533	8	46,305	9	59,860	9	59,900
Denmark	2	11,561	2	9,647	3	12,660	9	59,475	9	59,475	12	80,068
France	19	105,233	28	151,089	27	146,872	29	169,298	32	192,021	35	205,222
Germany	9	36,675	12	55,754	20	94,258	26	125,387	28	136,975	32	149,683
Holland	35	115,804	46	148,109	58	199,110	74	261,255	74	270,405	84	336,196
Italy	18	89,399	28	128,904	45	205,871	57	255,020	70	318,699	76	355,745
Japan	10	64,036	8	47,137	9	47,531	13	76,911	17	101,114	19	120,110
Norway	33	178,368	42	243,455	63	403,812	117	781,575	154	1,059,550	204	1,450,470
Spain	8	30,604	8	30,648	8	30,602	8	30,602	7	27,355	8	35,228
Sweden	2	6,599	2	4,873	3	16,270	7	49,127	12	93,986	17	134,490
Other countries	24	100,652	33	146,894	48	241,801	80	365,432	88	394,556	96	487,335
World's Total	917	5,160,923	939	5,177,630	1,050	5,847,086	1,236	6,987,922	1,308	7,536,368	1,439	8,549,827

* Excluding Tankers of less than 1,000 tons gross.

NUMBER AND TONNAGE OF MERCHANT VESSELS LAUNCHED.*

	1913.		1919.		1923.		1925.		1929.		1931 (1st 9 months).	
	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	688	1,932,153	612	1,620,442	222	645,651	342	1,084,633	489	1,522,623	122	395,959
British Dominions	77	26,744	235	298,495	41	37,072	47	32,220	47	21,327	24	9,581
United States †	182	228,232	852	3,579,826	69	96,491	94	78,766	59	100,632	48	136,116
Denmark	31	40,932	46	37,766	24	49,479	21	73,268	34	111,496	21	98,830
France	89	176,095	34	32,633	27	96,644	35	75,569	16	81,607	11	94,538
Germany	162	465,226	No returns.		109	345,062	121	406,374	85	249,077	51	104,053
Holland	95	104,296	100	137,086	35	65,632	47	78,823	77	186,517	46	95,487
Italy	38	50,356	32	82,713	21	66,523	31	142,046	32	71,497	27	95,450
Japan	152	64,664	133	611,883	44	72,475	23	55,784	40	164,457	15	65,489
Norway	74	50,637	82	57,578	48	42,619	48	28,805	51	39,604	11	12,995
Spain	12	8,488	41	52,609	7	4,488	1	127	8	37,023	7	42,589
Sweden	25	18,524	53	50,971	10	20,118	17	53,750	29	107,246	17	92,317
Other Countries	88	96,724	36	26,755	27	20,410	17	19,371	38	62,859	19	12,726
World's Total	1713	3,282,071	2256	6,588,757	684	1,562,664	844	2,129,536	1005	2,755,965	419	1,256,130

* Figures given include all steamers, motorships, and sailing vessels of 100 gross tons and upwards.

† Excluding vessels built at ports on the Great Lakes of America.

MERCHANT VESSELS UNDER CONSTRUCTION.*

	1913.		1919.		1925.		1929.		1931.	
	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage	No.	Gross Tonnage.
Gt. Britain and Ireland	508	1,987,254	781	2,816,773	257	1,009,155	341	1,448,355	88	417,385
British Dominions	67	36,923	151	254,632	23	32,047	32	33,973	7	3,551
United States †	60	121,304	641	3,161,714	36	69,866	26	96,010	25	261,364
Denmark	11	25,257	45	68,074	18	70,760	19	80,855	12	69,160
France	42	249,595	64	174,736	36	150,220	19	135,776	12	169,720
Germany	92	535,555	No returns.		73	306,626	66	235,499	20	113,468
Holland	50	128,730	113	288,042	44	127,775	55	224,029	31	95,216
Italy	19	56,126	108	285,928	40	269,802	36	69,834	20	159,147
Japan	17	64,905	64	299,600	13	53,270	23	156,810	11	32,620
Norway	45	41,746	73	83,941	22	19,770	25	32,370	23	25,440
Spain	4	2,830	26	90,705	5	11,427	13	45,137	10	53,889
Sweden	13	16,665	64	101,217	20	71,580	31	111,427	20	121,080
Other Countries	22	89,036	49	60,353	22	14,607	16	19,191	11	9,080
World's Total	968	3,368,054	2179	7,685,715	609	2,206,905	739	2,801,339	290	1,531,120

* The figures give the number and aggregate gross tonnage of steamers, motorships, and sailing vessels under construction on September 30 of each year

† Excluding vessels building at ports on the Great Lakes of America.

ANNUAL MERCHANT SHIPPING LOSSES OF THE WORLD.*

	1913.			1919.			1924.			1927.			1929.			1930.		
	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.
Gt. Brit. & Ireland	113	199,453	1·07	99	151,653	·92	74	111,207	·58	59	66,348	·34	61	113,420	·56	48	100,523	·49
British Dominions	37	20,091	1·16	89	52,539	2·56	61	41,325	1·49	41	24,143	·84	50	41,253	1·40	34	8,440	·29
United States ‡ .	91	71,469	2·38	115	150,272	1·15	64	87,418	·65	57	104,992	·87	44	78,103	·66	40	49,451	·43
Denmark . . .	13	6,583	·86	15	5,295	·75	13	14,198	1·37	6	5,133	·48	10	11,066	1·05	9	7,154	·66
France	30	34,506	1·57	34	40,420	1·81	25	27,726	·79	26	35,353	1·02	32	33,291	·99	17	18,186	·37
Germany . . .	31	56,379	1·11	50	24,167	—	26	23,095	·78	18	27,490	·82	29	34,243	·84	15	30,596	·72
Holland . . .	4	1,340	·10	23	11,550	·73	1	801	·03	6	21,403	·81	4	2,689	·09	5	14,238	·46
Italy	26	26,881	1·77	8	3,096	·23	16	38,810	1·37	23	57,270	1·64	26	38,226	1·16	18	16,398	·49
Japan†	25	25,514	1·7	38	41,418	1·77	42	70,933	1·85	42	76,212	1·89	33	67,032	1·60	41	64,870	1·50
Norway . . .	61	60,648	2·47	41	44,132	2·37	22	23,786	·95	29	21,571	·76	30	25,460	·79	18	24,615	·67
Spain	13	15,928	1·89	16	9,752	1·30	10	10,181	·82	10	10,424	·90	9	16,805	1·45	14	9,600	·78
Sweden	30	17,327	1·65	38	29,021	2·92	16	16,627	1·33	11	10,390	·76	11	8,236	·55	13	12,419	·76
Other Countries .	36	42,686	—	65	54,719	—	52	65,438	—	53	56,663	—	64	86,302	—	45	63,320	—
World's Total .	542	608,235	—	635	622,805	—	422	531,545	—	381	517,392	—	403	556,126	—	317	414,810	—

* Figures refer to steam, motor, and sailing vessels of 100 gross tons and over totally lost, condemned, etc. The tonnage given is gross for steamers and motorships, and net for sailing ships up to and including the returns for 1919; in subsequent returns the tonnage is gross for steamers, motorships, and sailing ships.

† Japanese sailing vessels not included.

‡ Excluding ships trading on the Great Lakes of America.

Largest Merchant Vessels of the World.

A list of all vessels of 10,000 tons gross or more arranged in order of gross tonnage.

(T.= turbine engines; M.= oil engines; T. & R.= turbines & reciprocating engines; T.E.= turbo-electric.)

Gross tonnage.	Name.	Speed † (knots.)	Date built.	Flag.	Owners.	L.* (ft.)	B*. (ft.)	D.* (ft.)
56,621	Majestic (T.)	25	1921	Br.	White Star Line	915·5	100·1	58·2
52,226	Berengaria (T.)	23	1912	Br.	Cunard Line	883·6	98·3	57·2
51,656	Bremen (T.)	26	1929	Ger.	Norddeutscher Lloyd	898·7	101·9	48·1
50,100	Rex (T.)	—	1932	Ital.	Nav. Gen. Italiana	833·8	97·1	47·8
49,746	Europa (T.)	26	1928	Ger.	Norddeutscher Lloyd	890·2	102·1	48·0
48,591	Leviathan (T.)	25	1914	U.S.	United States Lines	907·6	100·3	58·0
46,439	Olympic (T. & R.)	22½	1911	Br.	White Star Line	852·5	92·5	59·5
46,000	Conte di Savoia (T.)	—	1932	Ital.	Lloyd Sabaudo	790·0	96·0	48·6
45,647	Aquitania (T.)	23	1914	Br.	Cunard Line	868·7	97·0	49·7
43,153	Ile de France (T.)	23	1926	Fr.	C.G.T. (French Line)	763·7	92·0	55·9
42,348	Empress of Britain (T.)	24	1930	Br.	Canadian Pacific	733·3	97·8	56·0
40,945	L'Atlantique (T.)	—	1930	Fr.	Cie. de Nav. Sud-Atlantique	713·6	91·8	57·7
34,569	Paris (T.)	21	1921	Fr.	C.G.T. (French Line)	735·4	85·3	59·1
34,351	Homeric	20	1922	Br.	White Star Line	751·0	83·3	48·6
32,650	Augustus (M.)	19	1927	Ital.	Nav. Gen. Italiana	666·3	82·8	47·2
32,583	Roma (T.)	21	1926	Ital.	Nav. Gen. Italiana	664·7	82·6	51·5
32,565	Columbus	21	1922	Ger.	Norddeutscher Lloyd	749·6	83·1	49·4
30,696	Mauretania (T.)	25	1907	Br.	Cunard Line	762·2	88·0	57·1
29,511	Statendam (T.)	18	1926	Holl.	Holland-Amerika Line	670·4	81·4	49·4
28,000	Georgic (M.)	—	1932	Br.	White Star Line	683·6	82·4	48·6
27,561	Cap Arcona (T.)	20	1927	Ger.	Hamburg Sud-Amerika Line	643·6	84·6	41·9
27,132	Belgenland (T. & R.)	17½	1917	Br.	F. Leyland & Co.	670·4	78·4	44·7
26,943	Britannic (M.)	18	1930	Br.	White Star Line	683·6	82·4	48·6
26,032	Empress of Japan (T.)	—	1930	Br.	Canadian Pacific	644·0	83·8	44·5
26,000	Champlain (T.)	—	1931	Fr.	C.G.T. (French Line)	607·0	82·8	67·8
25,661	Conte Grande (T.)	21	1928	Ital.	Lloyd Sabaudo	652·2	78·3	27·2
25,178	Lafayette (M.)	17	1929	Fr.	C.G.T. (French Line)	577·2	77·6	27·9
24,679	Adriatic	18	1906	Br.	White Star Line	709·2	75·5	52·6
24,416	Conte Biancamano (T.)	20	1925	Ital.	Lloyd Sabaudo	650·9	76·1	27·5
24,281	Duilio (T.)	21	1923	Ital.	Nav. Gen. Italiana	602·4	76·3	46·3
24,149	Rotterdam	17	1908	Holl.	Holland-Amerika Line	650·5	77·4	43·5
23,970	Vulcania (M.)	19	1927	Ital.	Cosulich Line	599·0	79·5	46·5
23,940	Saturnia (M.)	19	1927	Ital.	Cosulich Line	606·2	79·8	46·5
23,884	Baltic	17	1904	Br.	White Star Line	709·2	75·6	52·6
23,788	George Washington	18½	1908	U.S.	United States Lines	699·1	78·2	50·1
23,769	France (T.)	20	1912	Fr.	C.G.T. (French Line)	690·1	75·6	48·5
22,547	Strathnaver (T.E.)	—	1931	Br.	P. & O.	638·7	80·2	33·1
22,424	Monarch of Bermuda (T.E.)	—	1931	Br.	Furness Withy	553·2	76·7	39·0
22,181	Alcantara (M.)	17½	1926	Br.	Royal Mail	630·5	78·5	40·5
22,071	Asturias (M.)	17½	1925	Br.	Royal Mail	630·5	78·5	40·5
22,000	Mariposa (T.)	—	1931	U.S.	Oceanic S.S. Co.	604·0	79·3	30·5
22,000	Monterey (T.)	—	1932	U.S.	Oceanic S.S. Co.	604·0	79·3	30·5
21,998	Minnetonka (T.)	16½	1924	Br.	Atlantic Transport Line	600·8	80·4	49·4
21,936	President Hoover (T.E.)	—	1930	U.S.	Dollar S.S. Lines	615·0	81·0	52·0
21,936	President Coolidge (T.E.)	—	1931	U.S.	Dollar S.S. Lines	615·0	81·0	52·0
21,867	New York (T.)	18½	1927	Ger.	Hamburg-Amerika Line	602·5	79·0	42·1
21,833	Empress of Australia (T.)	18	1914	Br.	Canadian Pacific	589·9	75·2	41·5
21,716	Minnewaska (T.)	16½	1923	Br.	Atlantic Transport Line	600·8	80·4	49·4
21,691	Hamburg (T.)	18½	1925	Ger.	Hamburg-Amerika Line	602·5	78·7	51·6
21,657	Giulio Cesare (T.)	19	1921	Ital.	Nav. Gen. Italiana	602·4	76·5	46·3
21,517	Empress of Canada (T.)	20	1922	Br.	Canadian Pacific	627·0	77·9	42·2
21,500	Strathaird (T.E.)	—	1931	Br.	P. & O.	638·0	80·0	33·0
21,329	America	17	1905	U.S.	United States Lines	668·8	74·3	47·8
21,011	Cap Polonio (T. & R.)	18	1914	Ger.	Hamburg Sud-Amerika Line	637·8	72·4	39·5
20,952	Mooltan (T. & R.)	17½	1923	Br.	P. & O.	600·8	73·4	48·6
20,931	Albert Ballin (T.)	18½	1923	Ger.	Hamburg-Amerika Line	602·4	78·7	41·0
20,914	Maloja	17½	1923	Br.	P. & O.	600·8	73·4	48·6
20,773	Virginia (T.E.)	18	1928	U.S.	American Line S.S. Corp.	586·4	80·3	52·0
20,742	Deutschland (T.)	18½	1923	Ger.	Hamburg-Amerika Line	602·4	72·2	41·9
20,526	Pennsylvania (T.E.)	—	1929	U.S.	American Line S.S. Corp.	586·0	80·3	20·5
20,445	Warwick Castle (M.)	18	1930	Br.	Union Castle Line	651·5	75·5	37·4
20,325	California (T.E.)	18	1928	U.S.	American Line S.S. Corp.	574·4	80·3	52·0
20,277	Carinthia (T.)	16½	1925	Br.	Cunard Line	600·7	73·8	40·7
20,223	Kungsholm (M.)	17	1928	Swed.	Svenska-Amerika Line	594·9	78·2	37·8
20,175	Franconia (T.)	16½	1923	Br.	Cunard Line	601·3	73·7	40·6
20,123	Duchess of Bedford (T.)	17½	1928	Br.	Canadian Pacific	581·9	75·2	41·8
20,119	Duchess of Atholl (T.)	17½	1928	Br.	Canadian Pacific	580·0	75·3	41·8

* The registered dimensions are measured as follows: Length from fore part of stem at extreme top to aft side of head of stern post, or centre of rudder stock if a balanced rudder is fitted; Breadth is taken to outside of plating; Depth from top of beam at centre line of tonnage deck amidships to ceiling. If there is no ceiling it is measured to the tank top. If there are more than two decks, the tonnage deck is the second deck, counting from below.

† The speeds shown in this Table are as given by the owners.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
20,109	Winchester Castle (M.)	18	1930	Br.	Union Castle Line	631·6	75·5	37·5
20,063	Carnarvon Castle (M.)	18	1926	Br.	Union Castle Line	630·7	73·5	37·5
20,032	Otranto (T.)	20	1925	Br.	Orient Line	632·0	75·2	32·9
20,022	Duchess of Richmond (T.)	18	1928	Br.	Canadian Pacific	581·9	75·2	41·7
20,021	Duchess of York (T.)	18	1929	Br.	Canadian Pacific	581·9	75·2	41·7
20,001	Oronsay (T.)	20	1925	Br.	Orient Line	633·6	75·2	33·0
19,970	Orontes (T.)	20	1929	Br.	Orient Line	632·0	75·2	33·0
19,941	Orford (T.)	20	1927	Br.	Orient Line	632·2	75·4	33·1
19,821	Reliance (T. & R.)	17	1920	Ger.	Hamburg-Amerika Line	590·4	72·3	39·7
19,777	Orama (T.)	20	1924	Br.	Orient Line	632·0	75·2	32·9
19,761	Scythia (T.)	16½	1920	Br.	Cunard Line	600·7	73·8	40·7
19,695	Laconia (T.)	16½	1922	Br.	Cunard Line	601·3	73·7	40·6
19,648	Viceroy of India (T.E.)	18	1928	Br.	P. & O.	582·7	76·0	45·5
19,597	Samaria (T.)	16½	1921	Br.	Cunard Line	601·5	73·7	40·7
19,464	Resolute (T. & R.)	17	1920	Ger.	Hamburg-Amerika Line	590·4	72·2	40·2
19,361	Monticello	23½	1902	U.S.	U.S. Shipping Board	684·3	72·3	40·2
19,129	Marnix van St. Aldegonde (M.)	17	1929	Holl.	Nederland Stoom. Maats.	580·0	74·0	47·3
19,086	Bermuda (M.)	18	1927	Br.	Bermuda & W. Indies S.S. Co.	525·9	74·1	39·6
19,040	Johan van Oldenbarnevelt (M.)	17	1929	Holl.	Nederland Stoom. Maats.	580·0	74·6	47·3
19,023	Arundel Castle (T.)	18	1921	Br.	Union Castle Line	630·5	72·5	41·5
18,967	Windsor Castle (T.)	18	1922	Br.	Union Castle Line	632·4	72·5	41·6
18,940	Albertic	16½	1923	Br.	White Star Line	590·8	72·0	37·6
18,866	Lapland	17	1908	Br.	F. Leyland & Co.	605·8	70·4	37·4
18,765	Conte Verde (T.)	19	1923	Ital.	Lloyd Sabaudo	570·2	74·2	35·9
18,724	Laurentic (T. & R.)	17	1927	Br.	White Star Line	578·2	75·4	40·6
18,495	Ceramic (T. & R.)	16	1913	Br.	White Star Line	655·1	69·4	43·8
18,452	Empress of France (T.)	19	1913	Br.	Canadian Pacific	571·4	72·4	41·7
18,372	Mount Vernon	23½	1906	U.S.	U.S. Shipping Board	685·4	72·2	40·5
17,910	Republic	15	1907	U.S.	United States Lines	599·0	68·2	48·3
17,801	Kosmos	—	1929	Nor.	Kosmos A/S.	554·1	77·2	49·6
17,759	De Grasse (T.)	16	1924	Fr.	C.G.T. (French Line)	552·1	71·4	42·3
17,716	Gripsholm (M.)	17	1925	Swed.	Svenska-Amerika Line	553·0	74·4	37·7
17,707	Reina del Pacifico (M.)	19	1930	Br.	Pacific Stm. Nav. Co.	551·0	76·3	38·5
17,498	Chichibu Maru (M.)	19	1930	Jap.	Nippon Yusen Kaisha	560·0	74·0	42·5
17,491	Aorangi (M.)	18½	1924	Br.	Canadian-Australasian Line	580·1	72·2	43·4
17,281	Minnekahda (T. & R.)	16	1917	U.S.	Atlantic Transport Line	620·5	66·4	47·3
17,232	Malolo (T.)	22	1926	U.S.	Matson Nav. Co.	554·0	83·0	54·0
17,149	Nieuw Amsterdam	16	1906	Holl.	Holland-Amerika Line	600·3	68·9	35·6
17,048	Conte Rosso (T.)	19	1922	Ital.	Lloyd Sabaudo	570·2	74·2	35·9
17,046	Caledonia (T.)	15½	1925	Br.	Anchor Line	553·0	70·4	38·7
16,991	Tuscania (T.)	15½	1922	Br.	Anchor Line	552·3	70·3	38·6
16,990	Georges Philippar (M.)	—	1930	Fr.	Messageries Maritimes	542·7	68·2	46·9
16,981	Baloeran (M.)	18	1929	Holl.	Rotterdam Lloyd	550·0	70·0	44·0
16,979	Dempo (M.)	18	1930	Holl.	Rotterdam Lloyd	550·0	70·0	44·0
16,975	Asama Maru (M.)	19	1928	Jap.	Nippon Yusen Kaisha	560·0	72·0	42·5
16,975	Tatsuta Maru (M.)	19	1929	Jap.	Nippon Yusen Kaisha	560·0	72·0	42·5
16,970	Cleveland (T. & R.)	15½	1908	Ger.	Hamburg-Amerika Line	588·9	65·3	46·7
16,966	Kosmos II.	—	1931	Nor.	Hvalf. "Kosmos II" A/S.	553·4	77·2	37·6
16,923	Transylvania (T.)	15½	1925	Br.	Anchor Line	552·4	70·3	30·3
16,909	Empress of Asia (T.)	20	1913	Br.	Canadian Pacific	570·1	68·2	42·0
16,821	Arabic	17	1908	Br.	White Star Line	590·2	69·7	38·9
16,810	Empress of Russia (T.)	20	1913	Br.	Canadian Pacific	570·2	68·2	42·0
16,792	California (T.)	15½	1923	Br.	Anchor Line	553·0	70·4	38·8
16,753	Felix Roussel (M.)	15	1929	Fr.	Messageries Maritimes	534·8	68·2	46·9
16,738	Ranchi (T. & R.)	18	1925	Br.	P. & O.	548·5	71·3	43·2
16,737	Rangitata (M.)	15	1929	Br.	Federal Steam Nav. Co.	531·0	70·2	31·8
16,732	St. Louis (M.)	16	1928	Ger.	Hamburg-Amerika Line	543·8	72·4	42·1
16,712	Rangitane (M.)	15	1929	Br.	New Zealand Shipping Co.	531·0	70·2	31·8
16,699	Milwaukee (M.)	16	1929	Ger.	Hamburg-Amerika Line	546·6	72·4	42·2
16,698	Rangitiki (M.)	15	1929	Br.	New Zealand Shipping Co.	531·0	70·2	38·1
16,697	Rawalpindi	17	1925	Br.	P. & O.	547·7	71·3	43·4
16,688	Ranpura	17	1925	Br.	P. & O.	548·3	71·3	43·2
16,644	Rajputana	17	1926	Br.	P. & O.	547·7	71·3	43·4
16,596	Mongolia (T.)	16	1923	Br.	P. & O.	551·6	72·0	38·5
16,572	Narkunda	17	1920	Br.	P. & O.	581·4	69·4	27·7
16,556	Moldavia (T.)	16	1922	Br.	P. & O.	552·4	71·7	38·4
16,500	Westernland (T. & R.)	16	1918	Br.	F. Leyland & Co.	575·3	67·8	41·2
16,484	Doric (T.)	16	1923	Br.	White Star Line	575·5	67·9	41·2
16,436	C. O. Stillman (M.)	—	1928	Br.	International Petroleum Co.	565·7	75·6	44·5
16,418	Montcalm (T.)	17	1921	Br.	Canadian Pacific	549·5	70·2	40·2
16,402	Montrose (T.)	17	1922	Br.	Canadian Pacific	548·7	70·2	40·3
16,322	Pennland (T. & R.)	16	1922	Br.	F. Leyland & Co.	575·4	67·8	41·2
16,314	Montclare (T.)	17	1922	Br.	Canadian Pacific	549·5	70·2	40·2
16,297	Cameronia (T.)	15½	1920	Br.	Anchor Line	552·4	70·4	38·8
16,243	Lancastria (T.)	16½	1922	Br.	Cunard Line	552·8	70·4	38·8
16,088	Naldera	17	1918	Br.	P. & O.	580·9	67·2	44·4
16,063	Calgaric (T. & R.)	15	1918	Br.	White Star Line	550·3	67·3	43·0
15,704	Christiaan Huygens (M.)	17	1927	Holl.	Nederland Stoom. Maats.	551·5	68·8	36·2

† * See notes on p. 351.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots.)	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
15,575	President Fillmore	16	1904	U.S.	Dollar S.S. Lines	600·0	65·3	31·1
15,551	Almanzora (T. & R.)	17	1914	Br.	Royal Mail	570·0	67·3	33·3
15,543	President Johnson	16	1904	U.S.	Dollar S.S. Lines	600·0	65·3	31·1
15,507	Orduña (T. & R.)	15	1914	Br.	Pacific Stm. Nav. Co.	550·3	67·3	43·0
15,500	Aramis (M.)	—	1931	Fr.	Messageries Maritimes	542·6	69·6	47·0
15,495	Orbita (T. & R.)	15	1915	Br.	Pacific Stm. Nav. Co.	550·3	67·3	43·0
15,450	Veendam (T.)	15	1923	Holl.	Holland-Amerika Line	550·2	67·3	41·1
15,434	Volendam (T.)	15	1922	Holl.	Holland-Amerika Line	550·2	67·3	32·6
15,396	Chitral	17	1925	Br.	P. & O.	526·3	70·3	42·3
15,363	Massilia (T. & R.)	20	1920	Fr.	Cie. de Nav. Sud Atlantique	577·1	64·1	37·0
15,357	Svealand (M.)	—	1925	Swed.	Angf. Akt. Tirfing	561·3	72·2	44·1
15,355	Amerikaland (M.)	—	1925	Swed.	Angf. Akt. Tirfing	561·3	72·2	44·1
15,286	Berlin	16½	1925	Ger.	Norddeutscher Lloyd	549·3	69·2	34·8
15,279	Comorin	17	1925	Br.	P. & O.	523·5	70·2	42·3
15,276	Athos II (T.)	14	1925	Fr.	Messageries Maritimes	543·9	66·2	41·7
15,186	Minnedosa (T. & R.)	16½	1918	Br.	Canadian Pacific	520·0	67·2	41·8
15,183	Melita (T. & R.)	16½	1918	Br.	Canadian Pacific	520·0	67·2	50·3
15,135	Atlantis (T. & R.)	17	1913	Br.	Royal Mail	570·3	67·3	33·3
15,121	Cathay	16	1925	Br.	P. & O.	523·5	70·2	42·3
15,105	D'Artagnan	14	1924	Fr.	Messageries Maritimes	543·5	65·0	41·4
14,982	Ormonde (T.)	18	1917	Br.	Orient Line	580·5	66·7	40·5
14,947	Euripides (T. & R.)	15	1914	Br.	Aberdeen Line	550·7	67·4	44·1
14,878	Megantic	17	1909	Br.	White Star Line	550·4	67·3	41·2
14,825	Chenonceaux (T.)	13	1922	Fr.	Messageries Maritimes	543·4	65·1	41·1
14,783	Lutetia (T. & R.)	20	1913	Fr.	Cie. de Nav. Sud Atlantique	579·0	64·1	36·7
14,729	Pieter Corneliszoon Hooft (M.)	17	1925	Holl.	Nederland Stoom. Maats.	534·0	68·1	35·0
14,694	Arandora Star (T.)	16	1927	Br.	Blue Star Line	512·2	68·3	34·0
14,690	Dresden	15½	1914	Ger.	Norddeutscher Lloyd	550·0	67·3	35·1
14,690	General von Steuben (T. & R.)	16½	1922	Ger.	Norddeutscher Lloyd	526·9	65·0	43·7
14,652	Ulysses	13½	1913	Br.	Blue Funnel Line	563·2	68·4	40·2
14,629	Nestor	13½	1913	Br.	Blue Funnel Line	563·2	68·4	31·2
14,622	Arlanza (T. & R.)	17	1912	Br.	Royal Mail	570·3	65·3	33·3
14,577	Svend Foyn	—	1931	Nor.	Hvalf. Sydhavet	538·1	74·3	33·4
14,577	Vestfold	—	1931	Nor.	Hvalf. Vestfold	538·1	74·3	33·4
14,500	Corfu (T.)	—	1931	Br.	P. & O.	522·5	71·4	33·1
14,500	Carthage (T.)	—	1931	Br.	P. & O.	522·5	71·4	33·1
14,457	Taiyo Maru	16	1911	Jap.	Nippon Yusen Kaisha	560·0	65·3	31·2
14 362	Sir James Clark Ross (M)	—	1930	Nor.	Hvalfanger A/S Rosshavet	537·9	74·3	34·4
14,305	Charles G. Black	—	1921	U.S.	Standard Oil Co.	550·3	72·2	43·7
14,198	Hobson's Bay (T.)	16	1922	Br.	Aberdeen-Commonwealth	530·6	68·3	39·9
14,187	President Lincoln (T.)	18	1921	U.S.	Dollar S.S. Lines	516·5	72·2	27·8
14,187	President Madison (T.)	18	1921	U.S.	Admiral Oriental Line	516·5	72·2	27·8
14,184	Largs Bay (T.)	16	1921	Br.	Aberdeen-Commonwealth	530·9	68·3	39·9
14,176	Esperance Bay (T.)	16	1922	Br.	Aberdeen-Commonwealth	530·9	68·3	39·9
14,174	President Jefferson (T.)	18	1920	U.S.	Admiral Oriental Line	516·5	72·2	27·8
14,164	Jervis Bay (T.)	16	1922	Br.	Aberdeen-Commonwealth	530·6	68·3	39·9
14,145	Moreton Bay (T.)	16	1921	Br.	Aberdeen-Commonwealth	530·6	68·3	39·9
14,137	Highland Monarch (M.)	15	1928	Br.	Nelson Line	523·4	69·4	37·1
14,131	Highland Chieftain (M.)	15	1929	Br.	Nelson Line	523·4	69·4	37·1
14,131	Highland Brigade (M.)	15	1929	Br.	Nelson Line	523·4	69·4	37·1
14,128	Highland Princess (M.)	15	1928	Br.	Nelson Line	523·4	69·4	37·1
14,127	President McKinley (T.)	18	1921	U.S.	Admiral Oriental Line	516·5	72·2	27·8
14,127	President Wilson (T.)	18	1921	U.S.	Dollar S.S. Lines	516·5	72·2	27·8
14,124	President Jackson (T.)	18	1921	U.S.	Admiral Oriental Line	517·0	72·2	27·8
14,123	President Cleveland (T.)	18	1921	U.S.	Dollar S.S. Lines	517·0	72·2	36·8
14,123	President Pierce (T.)	18	1921	U.S.	Dollar S.S. Lines	517·0	72·2	27·8
14,123	President Taft (T.)	18	1921	U.S.	Dollar S.S. Lines	517·0	72·2	27·8
14,119	President Grant (T.)	18	1921	U.S.	Admiral Oriental Line	517·0	72·2	27·8
14,075	Oropesa (T.)	15	1920	Br.	Pacific Stm. Nav. Co.	530·0	66·3	41·2
14,054	John D. Archbold	—	1921	U.S.	Standard Oil Co.	570·2	75·1	42·6
14,054	William Rockefeller	—	1921	U.S.	Standard Oil Co.	554·9	75·3	43·0
14,030	Alaunia (T.)	15	1925	Br.	Cunard Line	519·6	65·2	39·2
14,013	Ascania (T.)	15	1925	Br.	Cunard Line	520·0	65·3	39·0
13,984	Aurania (T.)	15	1924	Br.	Cunard Line	519·7	65·3	39·2
13,950	Andania (T.)	15	1922	Br.	Cunard Line	520·2	65·3	39·2
13,912	Ausonia (T.)	15	1921	Br.	Cunard Line	520·0	65·3	39·1
13,882	Monte Rosa (M.)	14½	1930	Ger.	Hamburg Sud-Amerika Line	500·3	65·7	37·8
13,870	Monte Pascoal (M.)	14½	1930	Ger.	Hamburg Sud-Amerika Line	500·3	65·7	37·8
13,869	President Harding (T.)	19	1921	U.S.	United States Lines	516·5	72·2	27·8
13,869	President Roosevelt (T.)	20	1922	U.S.	United States Lines	516·5	72·2	27·8
13,868	Gelria	16½	1913	Holl.	Holland Lloyd	541·1	65·8	35·3
13,867	Antonia (T.)	15	1921	Br.	Cunard Line	519·9	65·3	39·1
13,834	Hektoria	13	1899	Nor.	A/S. Hektor	550·2	63·3	32·0
13,801	New Sevilla	13	1900	Br.	Sevilla Whaling Co.	550·2	63·3	39·9
13,789	Southern Cross (T.)	18½	1920	U.S.	Munson S.S. Line	516·5	72·2	27·8
13,750	Monte Olivia (M.)	14½	1924	Ger.	Hamburg Sud-Amerika Line	500·6	65·8	37·9
13,736	American Legion (T.)	18½	1920	U.S.	Munson S.S. Line	516·5	72·2	27·8
13,712	Pan America (T.)	18½	1921	U.S.	Munson S.S. Line	517·0	72·2	27·8
13,712	Western World (T.)	18½	1921	U.S.	Munson S.S. Line	517·0	72·2	41·0

† * See notes on p. 351.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
13,682	André Lebon	14	1913	Fr.	Messageries Maritimes	508·2	61·6	45·8
13,640	Tafelberg	—	1930	Br.	Kerguelen Sealing & Whaling Co.	508·3	72·5	35·7
13,625	Monte Sarmiento (M.)	14½	1924	Ger.	Hamburg Sud-Amerika Line.	500·6	65·8	37·9
13,615	Cap Norte (T. & R.)	15	1922	Ger.	Hamburg Sud-Amerika Line.	499·5	64·0	38·7
13,589	Antonio Delfino (T. & R.)	15	1921	Ger.	Hamburg Sud-Amerika Line.	499·5	64·0	38·7
13,475	Letitia (T.)	15½	1925	Br.	Anchor-Donaldson	525·7	66·4	29·5
13,465	Athenia (T.)	15½	1923	Br.	Anchor-Donaldson	526·3	66·4	38·1
13,415	Niagara (T. & R.)	18	1913	Br.	Union S.S. Co. of N.Z.	524·7	66·3	34·5
13,401	Tenyo Maru (T.)	16	1908	Jap.	Nippon Yusen Kaisha	558·0	61·9	35·5
13,387	Stuttgart	16	1923	Ger.	Norddeutscher Lloyd	527·0	65·0	34·7
13,361	Balmoral Castle	17	1910	Br.	Union Castle Line	570·0	64·5	38·9
13,330	Edinburgh Castle	17	1910	Br.	Union Castle Line	570·2	64·7	38·7
13,248	Voltaire	14½	1923	Br.	Lamport & Holt	510·6	64·3	39·3
13,247	Juvenal	—	1928	Arg.	Cia. Gen. de Combustibles	556·0	74·1	40·3
13,246	C. A. Larsen	—	1913	Nor.	Hvalfanger A/S. Rosshavet	527·2	66·6	33·9
13,233	Vandyck (T.)	14½	1921	Br.	Lamport & Holt	510·6	64·3	39·3
13,156	Stavangerfjord	16½	1918	Nor.	Norske-Amerika Line	532·5	64·2	29·3
13,072	Baradine (T. & R.)	15½	1921	Br.	P. & O.	519·9	64·4	37·8
13,068	Victoria (M.)	—	1931	Ital.	Lloyd Triestino	540·6	69·9	30·9
13,062	Barrabool (T. & R.)	15½	1922	Br.	P. & O.	519·9	64·4	37·8
13,056	San Fernando (T.)	—	1919	Br.	Eagle Oil Transport Co.	530·4	69·4	42·2
13,037	San Felix (T.)	11	1921	Br.	Eagle Oil Transport Co.	530·4	69·4	42·2
13,031	San Fabian (T.)	11	1922	Br.	Eagle Oil Transport Co.	530·5	69·4	42·0
13,026	Shinyo Maru (T.)	16	1911	Jap.	Nippon Yusen Kaisha	558·0	61·9	35·5
12,996	Ballarat (T. & R.)	15½	1921	Br.	P. & O.	519·8	64·2	37·8
12,995	Ausonia (T.)	21	1928	Ital.	Soc. Ital. di Servizi Marittimi	517·3	66·4	39·2
12,990	Balranald (T. & R.)	15½	1922	Br.	P. & O.	519·8	64·2	29·8
12,975	Kenilworth Castle	17	1904	Br.	Union Castle Line	570·2	64·7	38·7
12,973	Armadale Castle	17	1903	Br.	Union Castle Line	570·1	64·5	39·0
12,972	Bendigo (T. & R.)	15½	1922	Br.	P. & O.	519·8	64·2	37·8
12,951	California (T.)	14	1920	Ital.	Nav. Libera Triestina	523·1	64·0	43·9
12,915	San Gerardo (T.)	11	1922	Br.	Eagle Oil Transport Co.	530·2	68·5	42·1
12,910	San Gaspar (T.)	11	1921	Br.	Eagle Oil Transport Co.	530·2	68·5	42·1
12,872	Avila Star (T.)	16	1927	Br.	Blue Star Line	510·2	68·2	33·9
12,858	Avelona Star (T.)	16	1927	Br.	Blue Star Line	510·2	68·2	33·9
12,848	Almeda Star (T.)	16	1926	Br.	Blue Star Line	512·2	68·3	34·0
12,846	Andalucia Star (T.)	16	1927	Br.	Blue Star Line	512·2	68·3	34·0
12,842	San Florentino (T.)	—	1919	Br.	Eagle Oil Transport Co.	530·4	68·6	42·0
12,692	Porthos	13½	1914	Fr.	Messageries Maritimes	510·8	61·6	42·1
12,678	Rochambeau (T. & R.)	15	1911	Fr.	C.G.T. (French Line)	559·4	63·7	43·3
12,642	City of Los Angeles (T.)	16	1899	U.S.	Los Angeles S.S. Co.	560·6	62·3	35·9
12,639	Vikingen	—	1929	Br.	Viking Whaling Co.	493·0	71·1	34·2
12,510	Gulfpride (M.)	—	1927	U.S.	Gulf Refining Co.	525·0	74·3	31·6
12,420	Metagama	16	1915	Br.	Canadian Pacific	500·4	64·2	37·9
12,385	Saxon	17	1900	Br.	Union Castle Line	570·5	64·4	38·6
12,358	Skytteren	13	1901	Nor.	A/S. Skytteren	550·2	63·3	39·9
12,354	Tamaroa (T.)	15	1922	Br.	Aberdeen Line	500·4	63·2	39·6
12,352	Ionic	13	1902	Br.	White Star Line	500·3	63·3	45·0
12,333	Mataroa (T.)	15	1922	Br.	Aberdeen Line	500·4	63·2	39·6
12,326	Sultan Star (T.)	16	1930	Br.	Blue Star Line	486·1	70·2	36·6
12,323	J. A. Mowinckel (M.)	—	1930	Danzig	Baltisch-Amer. Petrol. Import	521·8	70·4	38·8
12,286	San Melito	—	1914	Br.	Eagle Oil Transport Co.	530·0	66·5	33·5
12,279	Solglimt	15½	1900	Nor.	Hvalfangerselsk. Atlas A/S.	547·1	62·1	34·6
12,272	Gange	18	1912	Ital.	Lloyd Triestino	477·5	60·2	43·2
12,263	Champollion	15	1924	Fr.	Messageries Maritimes	495·1	62·7	40·5
12,257	Oroya (T.)	14	1923	Br.	Pacific Steam Nav. Co.	525·3	62·8	32·1
12,239	Mariette Pacha	15	1925	Fr.	Messageries Maritimes	508·5	62·6	43·6
12,231	Thorshammer	11	1914	Nor.	Bryde & Dahls Hvalf. A/S.	525·5	66·5	41·4
12,224	Ole Wegger	11	1914	Nor.	A/S. Ornen	527·1	66·6	42·1
12,220	Mexique (T. & R.)	16	1915	Fr.	C.G.T. (French Line)	546·7	64·0	34·8
12,185	J. H. Senior (M.)	—	1931	Danzig	Baltisch-Amer. Petrol. Import	521·2	70·3	38·9
12,175	Heinrich v. Riedemann (M.)	—	1930	Danzig	Baltisch-Amer. Petrol. Import	521·1	70·2	38·8
12,153	Southern Empress	11	1914	Br.	Southn. Whaling & Sealing Co.	525·5	66·5	33·9
12,112	Rotorua	15	1911	Br.	Federal Stm. Nav. Co.	526·4	61·4	33·3
12,092	Southern Princess	—	1915	Br.	Southn. Whaling & Sealing Co.	530·0	66·6	33·5
12,076	Cadillac	10½	1917	Br.	Anglo-American Oil Co.	530·2	66·3	33·8
12,074	Saranac	10½	1918	Br.	Anglo-American Oil Co.	530·5	66·3	42·7
12,067	Pelagos	13	1901	Nor.	Hvalfangerselsk. Pelagos A/S.	500·3	63·3	45·0
12,043	Peter Hurll (M.)	—	1930	Danzig	Baltisch-Amer. Petrol. Import	521·2	70·2	38·7
12,041	Orsova	18	1909	Br.	Orient Line	536·2	63·3	34·3
12,040	Sibajak (M.)	16½	1927	Holl.	Rotterdam Lloyd	506·6	62·7	35·2
12,015	Arcadian	16½	1908	Br.	Royal Mail	520·3	62·3	31·8
12,003	Colombo	16	1917	Ital.	Nav. Gen. Italiana	518·0	64·0	24·2
11,999	Athelcrown (M.)	—	1929	Br.	United Molasses Co.	526·5	68·8	38·9
11,996	Providence	15	1915	Fr.	Cie. Fr. de N. (Cyp. Fabre)	511·8	59·7	43·5
11,952	F. H. Bedford, Jr. (M.)	—	1930	Danzig	Baltisch-Amer. Petrol. Import	521·4	70·2	38·7
11,951	Llangibby Castle (M.)	16½	1929	Br.	Union Castle Line	486·0	66·2	27·8
11,941	Calgorolite (M.)	—	1928	Br.	Imperial Oil	522·0	70·3	38·7

† * See notes on p. 351.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
11,938	Salvestria	12	1913	Br.	South Georgia Co.	500·3	62·4	34·6
11,930	Terukuni Maru (M.)	16½	1930	Jap.	Nippon Yusen Kaisha	507·0	64·0	37·0
11,930	Yasukuni Maru (M.)	16½	1930	Jap.	Nippon Yusen Kaisha	505·0	64·0	37·0
11,916	Argyllshire	14	1911	Br.	Federal Stm. Nav. Co.	526·2	61·4	33·3
11,885	Patria	15	1913	Fr.	Cie. Fr. de N. (Cyp. Fabre)	487·2	59·2	40·1
11,850	Frederik VIII.	17	1913	Den.	Forenede Damps. S.	523·5	62·3	38·3
11,810	Korea Maru	16	1901	Jap.	Nippon Yusen Kaisha	551·7	63·2	40·8
11,790	Siberia Maru	16	1901	Jap.	Nippon Yusen Kaisha	551·7	63·2	21·8
11,753	W. S. Farish (T.)	—	1930	U.S.	Standard Shipping Co.	525·0	74·3	40·5
11,752	G. Harrison Smith (T.)	—	1930	U.S.	Standard Shipping Co.	525·0	74·3	40·5
11,718	Virgilio (M.)	15	1927	Ital.	Nav. Gen. Italiana	482·2	61·9	33·4
11,669	Orazio (M.)	15	1927	Ital.	Nav. Gen. Italiana	482·2	61·9	33·4
11,637	Cabo San Antonio (M.)	—	1930	Sp.	Ybarra & Co.	482·5	63·4	33·4
11,637	Cabo San Agustin (M.)	—	1931	Sp.	Ybarra & Co.	482·5	63·4	33·4
11,637	Cabo Santo Tome (M.)	—	1931	Sp.	Ybarra & Co.	482·5	63·4	33·4
11,628	Australia (M.)	—	1928	U.S.	Texas S.S. Co.	509·7	60·2	39·9
11,622	Hikawa Maru (M.)	17	1930	Jap.	Nippon Yusen Kaisha	510·0	66·0	41·0
11,622	Hiye Maru (M.)	17	1930	Jap.	Nippon Yusen Kaisha	512·6	66·0	41·0
11,616	Heian Maru (M.)	17	1930	Jap	Nippon Yusen Kaisha	511·6	66·0	41·0
11,590	General Osorio (M.)	15	1928	Ger.	Hamburg-Amerika Line	498·5	66·0	32·8
11,580	Orcoma	15	1908	Br.	Pacific Stm. Nav. Co.	511·6	62·2	29·1
11,555	Northumberland (T.)	15	1915	Br.	Federal Stm. Nav. Co.	530·5	63·0	31·9
11,520	Morro Castle (T.E.)	20	1930	U.S.	Atlantic, Gulf & W. Indies Line	508·0	70·9	39·0
11,520	Oriente (T.E.)	20	1930	U.S.	Atlantic, Gulf & W. Indies Lines	508·0	70·9	39·0
11,518	Kaisar-i-Hind	17	1914	Br.	P. & O.	520·0	61·2	33·1
11,484	Darro	13½	1912	Br.	Royal Mail	500·7	62·3	40·2
11,484	Demerara	13½	1912	Br.	Royal Mail	500·7	62·3	40·2
11,483	Desna	13½	1912	Br.	Royal Mail	500·7	62·3	40·2
11,477	Deseado	13½	1912	Br.	Royal Mail	500·7	62·3	40·2
11,469	Sierra Cordoba	14½	1923	Ger.	Norddeutscher Lloyd	490·5	61·8	34·3
11,453	Worcestershire (M.)	15½	1931	Br.	Bibby Line	483·0	64·2	32·0
11,449	Tuscan Star (M.)	16	1930	Br.	Blue Star Line	471·0	68·3	35·1
11,439	Transbalt	12	1899	Russ.	Soviet Mercantile Fleet	501·1	62·2	46·3
11,431	Philoctetes (T.)	14	1922	Br.	Blue Funnel Line	511·9	63·2	41·1
11,430	Sierra Morena	14½	1924	Ger.	Norddeutscher Lloyd	490·5	61·8	34·3
11,414	Jean Laborde (M.)	15	1930	Fr.	Messageries Maritimes	463·6	61·8	28·3
11,410	Victolite (M.)	—	1928	Br.	Imperial Oil	510·2	68·2	38·0
11,406	Slamat (T.)	15	1923	Holl.	Rotterdam Lloyd	482·5	62·0	35·0
11,405	Esperia (T.)	21	1918	Ital.	Soc. Ital. di Servizi Marittimi	492·1	61·7	34·1
11,404	Vancolite (M.)	—	1928	Br.	Imperial Oil	510·2	68·2	38·0
11,404	Achilles (T.)	14	1920	Br.	Blue Funnel Line	507·4	63·2	41·1
11,395	Harry G. Seidel (M.)	—	1930	Danzig	Baltisch-Amer. Petrol. Import	513·2	68·1	39·4
11,392	Sierra Ventana	14½	1923	Ger.	Norddeutscher Lloyd	490·5	61·8	34·3
11,383	Remuera	14	1911	Br.	New Zealand Shipping Co.	485·0	62·3	41·0
11,375	Sphinx	14	1914	Fr.	Messageries Maritimes	478·0	60·7	40·6
11,347	Tyndareus	13½	1916	Br.	Blue Funnel Line	507·0	63·2	41·0
11,337	Cuba (T.)	15½	1923	Fr.	C.G.T. (French Line)	476·0	62·3	35·1
11,321	Sarpedon (T.)	15	1923	Br.	Blue Funnel Line	499·0	62·3	84·0
11,314	Patroclus (T.)	15	1923	Br.	Blue Funnel Line	498·8	62·3	26·4
11,309	Montrolite (M.)	—	1926	Br.	Imperial Oil	510·9	68·2	37·9
11,309	Canadolite (M.)	—	1926	Br.	Imperial Oil	510·0	68·0	38·0
11,293	Llanstephan Castle	14	1914	Br.	Union Castle Line	500·5	63·3	37·2
11,256	Leopoldville	14	1929	Belg.	Lloyd Royal Belge	478·8	62·2	35·0
11,254	General Artigas (T.)	13½	1923	Ger.	Hamburg-Amerika Line	473·6	60·7	41·9
11,251	General San Martin (T.)	13½	1922	Ger.	Hamburg-Amerika Line	473·6	60·7	41·9
11,246	California Standard (M.)	—	1929	U.S.	Standard Oil Co. of California	513·5	68·1	39·5
11,243	Hororata	14	1914	Br.	New Zealand Shipping Co.	511·1	64·2	32·0
11,231	Themistocles	15	1911	Br.	Aberdeen Line	500·6	62·3	39·4
11,220	Beltana	—	1912	Jap.	Toyo Hogei K.K.	500·1	62·2	37·8
11,202	Berrima	—	1913	—	———	500·1	62·2	37·8
11,198	Hector (T.)	15	1924	Br.	Blue Funnel Line	498·8	62·3	26·4
11,174	Antenor (T.)	15	1925	Br.	Blue Funnel Line	497·7	62·2	35·0
11,155	Espagne	15½	1909	Fr.	C.G.T. (French Line)	537·8	60·8	39·0
11,140	Jan Pieterszoon Coen	15	1915	Holl.	Nederland Stoom. Maats.	503·5	60·6	35·8
11,120	Macedonia	16	1904	Br.	P. & O.	530·4	60·4	25·5
11,103	Edison	13	1896	Gr.	National Stm. Nav. Co. of Greece	523·1	60·1	34·9
11,081	Achilles	—	1915	U.S.	Panama Canal	514·0	65·2	36·5
11,060	Nieuw Zeeland (T.)	15	1928	Holl.	Koninkl. Paketv. Maats.	540·0	62·5	33·4
11,057	Nieuw Holland (T.)	15	1927	Holl.	Koninkl. Paketv. Maats.	540·5	62·7	32·3
11,055	Drottningholm (T.)	16½	1905	Swed.	Svenska-Amerika Line	517·0	60·0	38·0
11,028	Foucauld	14	1922	Fr.	Chargeurs Réunis	483·4	58·9	34·9
11,015	Bergensfjord	16½	1913	Nor.	Norske-Amerika Line	512·4	61·2	29·4
11,000	Colombie (T.)	—	1931	Fr.	C.G.T. (French Line)	482·8	66·4	46·2
10,986	Malwa	16	1908	Br.	P. & O.	540·0	61·3	24·6
10,951	Huntingdon	14	1920	Br.	Federal Stm. Nav. Co.	520·7	64·2	38·1
10,946	Mantua	16	1909	Br.	P. & O.	540·0	61·3	24·6

† * See notes on p. 351.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
10,946	Norfolk	14	1918	Br.	Federal Stm. Nav. Co.	520·7	64·2	38·1
10,937	Cumberland	14	1919	Br.	Federal Stm. Nav. Co.	520·0	64·2	29·0
10,936	Fushimi Maru	14½	1914	Jap.	Nippon Yusen Kaisha	513·0	63·5	37·5
10,926	Eastern Prince (M.)	18	1929	Br.	Prince Line	496·2	64·8	35·4
10,926	Western Prince (M.)	18	1929	Br.	Prince Line	496·2	64·8	35·4
10,923	Hertford (T. & R.)	14	1917	Br.	Federal Stm. Nav. Co.	520·7	64·2	38·1
10,917	Northern Prince (M.)	18	1929	Br.	Prince Line	496·2	64·9	25·9
10,917	Southern Prince (M.)	18	1929	Br.	Prince Line	496·2	64·9	25·9
10,902	City of Paris (T.)	14½	1922	Br.	City Line	484·7	59·3	32·6
10,893	Chief Capilano	13	1920	Br.	Canadian-American Nav. Co.	523·5	65·7	37·5
10,870	Ruahine	14	1909	Br.	New Zealand Shipping Co.	480·6	60·3	32·1
10,852	Monowai (T. & R.)	20	1925	Br.	Union Royal Mail Line	500·4	63·2	34·0
10,846	Cambridge	14	1916	Br.	Federal Stm. Nav. Co.	524·5	65·7	37·3
10,836	Tjibesar (T.)	12	1922	Holl.	Java-China-Japan Line	500·1	63·7	39·2
10,833	Cristobal Colon (T.)	17	1922	Sp.	Cia. Trasatlantica	499·4	61·0	32·3
10,826	Karlsruhe	15½	1900	Ger.	Norddeutscher Lloyd.	523·5	60·2	34·7
10,816	Campana (T.)	15	1929	Fr.	Soc. Gen. de Transport Mar. à Vap.	510·6	67·0	32·1
10,804	Ulysses	—	1915	U.S.	American Tankers Corp.	514·0	65·2	36·5
10,800	Danmark (M.)	—	1931	Dan.	A/S. Dampsks. "Myren"	489.5	67·5	37·7
10,786	Llandaff Castle	14½	1926	Br.	Union Castle Line	471·1	61·7	39·0
10,782	Colombia (M.)	15	1930	Holl.	Koninkl. Nederlandsche S.M.	429·5	61·7	36·0
10,769	Albertville	14	1928	Belg.	Lloyd Royal Belge	494·1	62·0	24·0
10,725	Andrea F. Luckenbach (T.)	13	1919	U.S.	Luckenbach S.S. Co.	496·0	68·2	37·2
10,678	Indrapoera (M.)	15½	1925	U.S.	Rotterdam Lloyd	479·5	60·2	35·1
10,672	Suwa Maru	14½	1914	Jap.	Nippon Yusen Kaisha	516·0	62·6	34·9
10,662	Lewis Luckenbach (T.)	13	1919	U.S.	Luckenbach S.S. Co.	496·0	68·0	40·0
10,660	Vauban	13½	1912	Br.	Lamport & Holt	495·5	60·8	28·7
10,654	Staffordshire (M.)	15½	1928	Br.	Bibby Line.	483·6	62·3	32·0
10,646	Stuart Star (T.)	15	1926	Br.	Blue Star Line	475·8	67·3	36·6
10,644	Afric Star (T.)	15	1926	Br.	Blue Star Line	475·8	67·3	36·6
10,609	Llandovery Castle	14½	1925	Br.	Union Castle Line	471·1	61·7	39·0
10,583	Napier Star (T.)	15	1927	Br.	Blue Star Line	476·0	67·3	36·6
10,583	Rodney Star (T.)	15	1927	Br.	Blue Star Line	476·9	67·3	36·6
10,560	Shropshire (M.)	15½	1926	Br.	Bibby Line	483·6	60·3	31·8
10,560	Cheshire (M.)	15½	1927	Br.	Bibby Line	483·6	60·3	31·8
10,551	Habana (T.)	17	1921	Sp.	Cia. Trasatlantica	480·0	61·0	32·3
10,537	Cornwall (T.)	14	1920	Br.	Federal Stm. Nav. Co.	495·1	63·1	40·3
10,533	President Hayes	14	1920	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,533	President Monroe	14	1920	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,533	President Van Buren	14	1920	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,516	President Adams	14	1921	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,504	President Harrison	14	1921	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,502	Guadeloupe	13	1908	Fr.	C.G.T. (French Line)	508·4	57·8	39·5
10,500	President Polk	14	1921	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,495	President Garfield	14	1921	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,480	Lemoyne	—	1926	Br.	Canada S.S. Line	621·1	70·2	25·4
10,441	Doric Star (T.)	12	1921	Br.	Blue Star Line	499·8	64·0	37·0
10,421	Haruna Maru (T.)	15½	1922	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,420	Hakone Maru (T.)	15½	1921	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,413	Hakozaki Maru (T.)	15½	1922	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,400	Pan Gothia (M.)	—	1931	Swed.	Rederi. Oil Transport	—	—	—
10,388	California	—	1921	U.S.	Texas S.S. Co.	500·0	68·2	29·3
10,388	Beacon	—	1921	U.S.	Standard Shipping Co.	500·0	68·2	29·3
10,380	Hakusan Maru (T.)	15½	1923	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,374	Diomed (T.)	14	1922	Br.	Blue Funnel Line	491·0	62·4	31·1
10,355	Johan de Witt	15	1920	Holl.	Nederland Stoom. Maats.	482·2	59·2	34·8
10,353	Wilhelm A. Riedemann (M.)	—	1920	Danzig	Baltisch-Amer. Petrol. Import	525·7	66·5	33·5
10,348	Uruguay (T. & R.)	17	1913	Sp.	Cia. Trasatlantica	481·9	61·3	32·7
10,305	Calchas (T.)	14	1921	Br.	Blue Funnel Line	490·8	62·4	39·6
10,286	Perseus (T.)	14	1923	Br.	Blue Funnel Line	490·5	62·3	39·6
10,283	Menelaus (T.)	14	1923	Br.	Blue Funnel Line	495·5	62·3	39·6
10,268	Explorateur Grandidier	13	1924	Fr.	Messageries Maritimes	455·8	60·7	41·1
10,229	Ixion	12½	1912	Br.	Blue Funnel Line	506·0	60·3	39·5
10,227	Tamiahua	—	1921	U.S.	Southern Pacific S.S. Lines	500·0	71·2	31·2
10,224	Talthybius	13	1912	Br.	Blue Funnel Line	506·0	60·3	39·5
10,224	Europa (M.)	—	1931	Danzig	East Asiatic Co.	465·4	62·2	37·2
10,220	Delftdijk (M.)	15	1929	Holl.	Holland-Amerika Line	490·9	64·7	34·1
10,208	Gulfbird (M.)	—	1928	U.S.	Gulf Refining Co.	511·7	69·5	36·7
10,208	Gulfhawk (M.)	—	1928	U.S.	Gulf Refining Co.	511·7	69·5	36·7
10,208	Gulfwing (M.)	—	1928	U.S.	Gulf Refining Co.	511·7	69·5	36·7
10,196	Kraljica Marija	16½	1906	Jugosl.	Jugoslavenski Lloyd	515·2	61·3	30·5
10,193	Brazza (M.)	13½	1923	Fr.	Chargeurs Réunis	453·1	59·1	36·1
10,191	Gretafield	—	1928	Br.	Northern Petroleum Tank S.S. Co.	500·2	67·9	36·9
10,184	Yorkshire (T.)	15	1920	Br.	Bibby Line	482·4	58·3	40·4
10,171	Flandria (T.)	14½	1922	Holl.	Holland Lloyd	450·1	59·2	41·7
10,155	Damsterdijk (M.)	15	1930	Holl.	Holland-Amerika Line	490·9	64·7	34·1

† * See notes on p. 351.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
10,138	City of Nagpur	14	1922	Br.	City Line	469·9	59·3	40·0
10,137	Argentina (T. & R.)	17	1913	Sp.	Cia. Trasatlantica	480·0	61·3	40·7
10,123	Kerguelen (T.)	13½	1922	Fr.	Chargeurs Réunis	484·2	59·3	35·0
10,123	Jamaique (T.)	13½	1922	Fr.	Chargeurs Réunis	484·2	59·3	27·2
10,110	Amerika (M.)	15	1930	Dan.	East Asiatic Co.	465·4	62·2	37·2
10,107	Opawa (M.)	16	1931	Br.	N.Z. Shipping Co.	471·0	67·3	36·8
10,107	Orari (M.)	16	1931	Br.	N.Z. Shipping Co.	471·0	67·3	36·8
10,107	Sourabaya	12	1915	Br.	South Georgia Co.	470·2	58·3	32·2
10,086	Bernardin de Saint Pierre (T.)	13	1925	Fr.	Messageries Maritimes	455·8	60·8	41·0
10,078	Arctic Queen	12	1909	Br.	Hellyer Bros.	486·0	59·3	27·4
10,061	Commissaire Ramel	12½	1920	Fr.	Messageries Maritimes	478·8	59·2	33·4
10,058	Aeneas	13	1910	Br.	Blue Funnel Line	493·0	60·4	28·6
10,056	General Belgrano	12½	1913	Ger.	Akt. Ges. fur Seeschiffahrt	491·6	59·1	35·6
10,051	Koll (M.)	—	1930	Nor.	Odd Bergs Tankrederi	487·4	66·0	37·3
10,048	Ascanius	13	1910	Br.	Blue Funnel Line	493·0	60·4	28·6
10,048	Otaio (M.)	16	1930	Br.	N.Z. Shipping Co.	472·2	67·2	35·7
10,042	Beaverford (T.)	15½	1928	Br.	Canadian Pacific	503·0	61·8	37·5
10,041	Beaverhill (T.)	15½	1928	Br.	Canadian Pacific	503·0	61·8	37·5
10,028	Carl D. Bradley (T.E.)	—	1927	U.S.	Bradley Transportation Co.	623·2	65·2	30·2
10,014	Laurel (M.)	—	1930	Swed.	Rederi. Oil Transport	482·3	65·6	35·6
10,012	Oscar II.	15½	1901	Den.	Forenede Damps. S.	500·8	58·3	37·6
10,006	Tilawa	12	1924	Br.	British India S.N. Co.	451·0	59·3	36·8
10,002	Dunbar Castle (M.)	14½	1930	Br.	Union Castle Line	471·2	61·2	29·6
10,000	Anchises	13	1911	Br.	Blue Funnel Line	493·0	60·4	28·6
10,000	Talma	12	1923	Br.	British India S. N. Co.	451·0	59·3	36·8
10,000	Achimota (M.)	—	1930	Br.	Elder Dempster	460·0	63·8	31·3

† * See notes on p. 351.

NUMBERS OF VESSELS CLASSED BY VARIOUS CLASSIFICATION SOCIETIES.*

Society.	1913.	1919.	1923.	1925.	1928.	1930.	1931.
Lloyd's Register	10,466	9175	10,296	9973	10,077	10,471	10,710
British Corporation	876	1002	1306	1253	1417	1595	1626
American Bureau of Shipping: Record of American and Foreign Shipping	846	926	2392	2131	1928	1857	1904
American Bureau of Shipping: Gt. Lakes Register	572	442	416	383	383	353	358
Bureau Veritas	5165	5706	4998	5135	5097	5196	5277
Norske Veritas	1504	955	1242	1220	1307	1330	1398
Registro Italiano	1442	699	1872	1826	1693	1885	2117
Germanischer Lloyd	2848	†	2799	2855	2914	2913	3010

* Many vessels, of course, are not exclusively classed in one Register.
† No data available.

GENERAL PARTICULARS OF LARGE SHIPS OF VARIOUS NATIONALIITES.

Name of Ship	AQUITANIA.	MAURETANIA.	LEVIATHAN (ex Vaterland).	BERENGARIA (ex Imperator).	MAJESTIC (ex Bismarck).	BREMEN.
Builders	J. Brown & Co., Ltd., Clydebank	Swan, Hunter & W. Richardson, Ltd., Wallsend-on-Tyne	Blohm & Voss, Hamburg	Vulcan Co., Hamburg	Blohm & Voss, Hamburg	Akt. Ges. Weser, Bremen
Owners or Managers	Cunard Co.	Cunard Co.	United States Lines	Cunard Co.	White Star Line	Norddeutscher Lloyd
Year when built	1914	1907	1914	1912	1921	1929
Length over all	902 ft.	787 ft.	950 ft.	906 ft. 8½ in.	956 ft.	938 ft.
Length between perps. (or moulded)	865 ft.	760 ft.	907 ft.	883 ft. 6 in.	912 ft.	888 ft.
Breadth	97 ft.	88 ft.	100 ft. 3½ in.	98 ft. 3½ in.	100 ft.	101 ft. 8 in.
Depth (moulded)	64 ft. 6 in.	60 ft. 6 in.	63 ft.	63 ft.	64 ft.	45 ft. 6½ in. to D. Deck
Gross Tonnage	45,647	30,696	48,591	52,226	56,621	51,656
Draught	36 ft. 2 in.	36 ft. 2¼ in.	38 ft. 6 in.	39 ft.	38 ft. 11¼ in.	32 ft.
Displacement (tons)	53,176	41,590	63,100	63,060	64,000	51,830
Number of Passengers—						
First Class	744	524	672 †	813	1000	800
Second Class	623	438	535	702	545	800§
Third Class	1226	796	2392 ‡	1327	2392	600
Machinery Makers	John Brown & Co., Ltd.	Wallsend Slipway and Engineering Co., Ltd.	Blohm & Voss, Hamburg	Vulcan Co., Hamburg	Blohm & Voss, Hamburg	Akt. Ges. Weser, Bremen
Type of Engines	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws
Revs. per Minute	180	180	180–190	180	180	182
Total Shaft H.P.	60,000	75,000	—	76,250	66,000	92,500
No. and Type of Boilers	21 Cylindrical (double ended)	25 Cylindrical (23 double-ended, 2 single-ended)	46 Water Tube	46 Water Tube	48 Water Tube	20 Water Tube (11 double-ended, 9 single-ended)
No. of Furnaces	168 (oil-fired)	192 (oil-fired)	138 (oil fired)	46 (oil-fired)	48 (oil-fired)	(oil-fired)
Steam Pressure (lb. per sq. in.)	195	195	235	228	260	330
Total Heating Surface (sq. ft.)	138,595	167,520	210,440	203,000	220,000	183,458
Total Grate Area (sq. ft.)	3541	4048	3843	3763	4013	—
System of Draught	Howden's	Howden's	Howden's	Howden's	Forced	Forced
Speed on Service (knots)	23	25·5 *	23	23	25	26

* This figure is the mean speed attained for 27 consecutive runs across the North Atlantic in one year, covering a total distance of 77,500 nautical miles.
† 80 Berths for Servants and 110 Pullman Berths in addition. ‡ Including 1542 Fourth Class Passengers. § Includes 300 Tourist Class.

FASTEST MERCHANT VESSELS OF THE WORLD.†

Speed (knots).	Name.	Gross Tonnage.	Date built.	Flag.	Owners.	L.* (ft.).	B.* (ft.).	D.* (ft.).
26 and over	Bremen	51,656	1929	German	Norddeutscher Lloyd	898·7	101·9	48·2
	Europa	49,746	1928	,,	,,	890·2	102·1	48·0
25 and under 26	Majestic	56,621	1921	British	White Star Line	915·5	100·1	58·2
	Leviathan	48,591	1914	U.S.	United States Lines	907·6	100·3	58·2
	Mauretania . . .	30,696	1907	British	Cunard Line	762·2	88·0	57·1
	Anglia	3,460	1920	,,	L.M.S. Railway Co.	380·5	45·2	17·2
	Hibernia	3,458	1920	,,	,,	380·6	45·2	17·2
	Cambria	3,445	1921	,,	,,	380·6	45·2	17·2
	Scotia	3,441	1921	,,	,,	380·5	45·2	17·2
24 and under 25	Empress of Britain .	42,348	1931	British	Canadian Pacific Railway	733·3	97·8	56·0
	Versailles	1,903	1919	French	French State Railways (Southern Railway Co.)	300·6	36·1	21 4
	Paris	1,774	1913	British	Southern Railway Co.	293·5	35·6	15·2
23 and under 24	Ile de France . . .	43,153	1926	French	Cie. Gen. Transatlantique	763·7	92·0	55·9
	Maid of Orleans . .	2,386	1918	British	Southern Railway Co.	341·1	42·1	16·0
	Biarritz	2,388	1915	,,	,,	341·2	42·1	24·0
	Newhaven . . .	1,656	1911	French	French State Railways	292·0	34·6	22·1
	Rouen	1,656	1912	,,	(Southern Railway Co.)	292·0	34·6	22·1
	Worthing . . .	2,288	1928	British	Southern Railway	297·7	38·7	15·0
	Berengaria . . .	52,226	1912	British	Cunard Line	883·6	98·3	57·1
	Aquitania	45,647	1914	,,	,,	868·7	97·0	49·7
	H. F. Alexander . .	8,357	1915	U.S.	Admiral Line	509·5	63·1	21·0
	Monticello . . .	19,361	1902	,,	U.S. Shipping Board	684·3	72·3	40·2
	Mount Vernon . .	18,372	1906	,,	,,	685·4	72·2	40·5
	Lady of Mann . .	3,104	1930	British	Isle of Man Stm. Packet Co.	363·6	50·2	17·4
22 and under 23	Viking	1,957	1905	British	Isle of Man Stm. Packet Co.	350·4	42·0	16·1
	Engadine	1,786	1911	,,	Southern Railway Co.	316·0	41·1	15·8
	Riviera	1,675	1911	,,	,,	316·0	41·1	15·8
	Olympic	46,439	1911	,,	White Star Line	852·5	92·5	59·5
	Prinses Juliana . .	2,908	1920	Dutch	Stoomvaart Maat-	350·4	42·7	23·9
	Mecklenburg . . .	2,907	1922	,,	schappij "Zeeland"	350·4	42·7	23·9
	Oranje Nassau . .	2,885	1909	,,	,,	350·0	42·7	16·4
	Ben-my-Chree . .	2,586	1927	British	Isle of Man Stm. Packet Co.	355·0	46·1	17·4
	Wahine	4,436	1913	,,	Union S.S. Co. of N.Z.	375·0	52·2	25·6
	Prince David . . .	6,892	1930	,,	Canadian National Railways	366·4	57·1	18·9
	Prince Henry . . .	6,893	1930	,,		366 4	57·1	27·4
	Prince Robert . .	6,892	1930	,,		366·4	57·1	27·4
	Malolo	17,232	1927	U.S.	Matson Navigation Co.	554·0	83·2	30 7

* Registered dimensions; see note on p. 351. † The speeds used in compiling this table are as given by the owners.

NUMBERS OF MERCHANT VESSELS OF VARIOUS SPEEDS.†

Speed.	Number. 1910.	1922.	1926.	1928.	1930.	1931.	Speed.	Number. 1910.	1922.	1926.	1928.	1930.	1931.
25 knots and over	—	8	8	6	9	9	16½ knots	45	44	51	46	43	42
24 ,, to 25 .	—	9	6	3	2	3	16 ,,	126	131	162	170	181	184
23 ,, 24 .	—	5	9	9	11	12	15½ ,,	47	35	52	62	75	77
22 ,, 23 .	—	17	15	16	16	13	15 ,,	215	185	205	210	217	255
21 ,, 22 .	—	20	14	22	31	36	14½ ,,	85	81	100	106	129	135
20 ,, 21 .	105*	32	42	51	39	46	14 ,,	276	289	327	350	335	320
19 ,, 20 .	42	26	28	24	40	38	13½ ,,	138	170	169	183	205	222
18½ knots . .	24	18	20	19	24	28	13 ,,	462	458	451	446	488	504
18 ,, . .	60	54	50	49	67	77	12½ ,,	206	153	211	215	220	229
17½ ,, . .	48	36	22	19	20	19	12 ,,	732	790	918	882	865	860
17 ,, . .	83	88	120	122	103	108							

* This figure includes all merchant steamers of 20 knots and over in existence in 1910.
† The speeds used in compiling these tables are as given by the owners.

PARTICULARS OF FAST VOYAGES ON CERTAIN PASSENGER SERVICES.

Name of Vessel.	Owners.	Date of Voyage.	Ports between which Voyage was made.	Distance (Sea miles).	Time taken.	Average speed (Knots).	Best day's run (Knots).	Remarks.
Bremen . .	Norddeutscher Lloyd	July, 1929	Cherbourg to New York *	3,164	4d. 17h. 42m.	27·83	713	
,,	,, ,,	July, 1929	New York to Cherbourg *	3,084	4d. 14h. 30m.	27·91	667	
Europa. . .	,, ,,	March, 1930	Cherbourg to New York *	3,157	4d. 17h. 6m.	27·91	704	
,,	,, ,,	May, 1930	New York to Cherbourg *	3,200	4d. 20h. 48m.	27·40	654	
Mauretania . .	Cunard Line	Sept., 1910	Liverpool to New York §	2,780	4d. 10h. 41m.	26·06	—	* Cherbourg Breakwater and Ambrose Channel Light Vessel.
,,	,, ,,	Aug., 1924	New York to Cherbourg *	3,198	5d. 1h. 49m.	26·25	626	
,,	,, ,,	Aug., 1929	Cherbourg to New York *	3,162	4d. 21h. 44m.	26·85	687	
,,	,, ,,	Aug., 1929	New York to Plymouth †	3,098	4d. 17h. 50m.	27·22	636	† Ambrose Channel Light Vessel and Eddystone Lighthouse.
,,	,, ,,	Aug., 1929	Plymouth to Cherbourg *	106	—	29·7	—	
Majestic . .	White Star Line	Sept., 1923	New York to Cherbourg *	3,104	5d. 5h. 21m.	24·76	613	
Laurentic . .	,, ,,	June, 1930	Quebec to Liverpool ‡	2,444	5d. 21h. 15m.	17·30	—	‡ Father Point and Bar Light Vessel.
Empress of Britain	Canadian Pacific Steamships.	Oct., 1931	Cherbourg to Quebec (Father Point)	—	4d. 9h. 17m.	—	—	§ Daunts Rock and Sandy Hook Lightship.
Duchess of York	,, ,,	Sept., 1930	Greenock to Quebec	2,558	5d. 8h. 34m.	19·9	—	
Empress of Japan	,, ,,	Apr., 1931	Yokohama to Vancouver	—	7d. 20h. 16m.	—	—	‖ Record sea transit to Bombay, but not record speed as vessel did not deviate to Marseilles.
China . . .	P. & O.	Sept. 26 to Oct. 14, 1919	London to Bombay	6,258	17d. 20h. ‖	15 7	—	
Reina del Pacifico	Pacific Steam Navigation Co.	June 18 to Aug. 17, 1931	Liverpool, Valparaiso, Liverpool, *via* Panama Canal	18,366	59d. 13h. (actual steaming 43d. 3h.)	17·47	458	
Paris . . .	Southern Railway and French State Railway	July 14, 1913	Newhaven to Dieppe	65	2h. 35m. 37s.	25·07	—	
Maid of Orleans	Southern Railway	April, 1922	Dover to Calais	20	50m.	24·0	—	

DEVELOPMENT OF MARINE PROPELLING MACHINERY.

—	Approximate Date of Introduction in the United Kingdom.			
	Merchant.		Naval.	
Compound engines . .	—	1860	—	1865
Triple-expansion engines	—	1880	—	1885
Quadruple-expansion do.	—	1890	Not fitted . . .	—
Cylindrical boilers . .	—	1862	—	1869
Water-tube boilers . .	Cross-channel . .	1911	Destroyers . . .	1893
	Ocean liners . .	1914	Battleships . . .	1897
Direct turbines . . .	Cross-channel . .	1901	Destroyers . . .	1898
	Ocean liners . .	1905	Light cruisers . .	1904
			Battleships . . .	1906
Combination engines and turbines	Intermediate liner .	1908	(For cruising only)	1902
Combination machinery on common line shafting (Bauer-Wach) . .	Intermediate liner and cargo steamers	1926	—	—
Geared turbines . . .	Single-reduction .	1911	Single-reduction .	1913
	Double-reduction .	1916	Not fitted . . .	—
High pressure turbines .	Single-reduction .	1926	Destroyers . . .	1926
Electric propulsion . .	First attempts . .	1904	Not fitted . . .	—
	Diesel-electric . .	1913	—	—
	Turbo-electric . . (Large liner)	1929	—	—
Oil fuel burning . . .	First attempts . .	1870	Coal and oil—	
			Destroyers . .	1902
			Battleships . .	1904
	Modern plant . .	1892	Oil alone—	
			Destroyers . .	1910
			Battleships . .	1913
Heavy oil engines . .	First attempts . .	1904	Tender	1914
	Modern plant . .	1910	Submarines . .	1908
	Double-acting . .	1924	Subm. depôt ship .	1928
	Supercharging . .	1925	—	—
Pulverised Coal Firing .	First attempts . .	1928	—	—

MARINE ENGINES UNDER CONSTRUCTION IN THE WORLD
(Recorded by Lloyd's Register of Shipping as at the end of September, 1931).

Country in which building.	Steam Engines.				Oil Engines.		Total.	
	Reciprocating.		Turbines.					
	No.	I.H.P.	No.	S.H.P.	No.	I.H.P.	No.	H.P.
Gt. Britain & Ireland	50	61,595	13	296,880	25	110,680	88	469,155
British Dominions .	4	2,630	—	—	—	—	4	2,630
Belgium	—	—	—	—	3	2,100	3	2,100
Denmark . . .	—	—	—	—	14	60,150	14	60,150
France	1	600	2	181,000	39	37,790	42	219,390
Germany	15	10,670	—	—	35	125,435	50	136,105
Holland	4	2,110	—	—	16	71,940	20	74,050
Italy	2	1,750	2	237,000	11	82,800	15	321,550
Japan	1	1,300	1	6,500	17	33,350	19	41,150
Norway	12	13,050	—	—	2	6,000	14	19,050
Sweden	6	7,650	—	—	35	61,285	41	68,935
Switzerland . . .	—	—	—	—	25	18,590	25	18,590
United States . .	1	4,000	17	256,500	7	6,000	25	266,500
Other Countries .	3	2,630	—	—	1	2,500	4	5,130
Total . .	99	107,985	35	977,880	230	618,620	364	1,704,485

The horse-power is compiled from figures furnished by the engine makers.

PROGRESS IN MARINE MACHINERY.

		Dimensions.		Performance.		Engines.						Boilers.							
Type of vessel.	Year.	Length (feet).	Beam (feet).	Speed (knots).	Horse-power.	No. of Propellers.	Type of Machinery.*	No. of Cylinders (per shaft).	Propeller revs. per min.	Piston speed (f.p.m.)	Referred M.P. (lb. per sq. in.)	No. and Type.†	Working press. (lb. per sq. in.)	System of Draught.‡	Heating Surface per H.P. (sq. ft.)	H.P. per sq. ft. of grate.	Total weight of Machinery, "Steam Up" (tons).	H.P. per ton of Machinery.	Coal Consumption (lbs. per H.P. hour).
Atlantic liners	1881	500	50	18·0	10,680	1	C	3	64	770	29·1	—C	100	N	3·3	8·57	1,860	5·74	—
	1888	528	63	20·1	18,500	2	TE	3	86	860	35·3	9 DC	150	CS	2·75	14·3	2,516	7·4	1·7
	1893	600	65	22·0	30,000	2	TE	5	81	930	35	12 DC	165	N	2·78	11·4	4,935	6·1	1·6
	1899	685	68	20·7	27,000	2	TE	4	78	936	35	15 DC	192	AD	2·77	13·75	4,414	6·1	—
	1907	760	87	26·0	72,500	4	T	—	180	—	—	23 DC & 2 C	195	H	2·19	17·9	9,936	7·8	1·4
	1914	865	96	23·5	60,000	4	T	—	180	—	—	21 DC	195	H	2·31	16·9	9,302	6·5	1·3
	1921	912	100	23·5	66,000	4	T	—	180	—	—	48 W	260	FD	3·33	16·4	—	—	—
Intermediate Ocean liners	1880	400	45	12·5	3,000*	1	C	2	61	671	20·5	2 C	90	N	3·1	7·6	685	4·35	2·4
	1892	470	53	12·5	3,500*	2	TE	3	80	640	32·0	2 DC & 1 C	170	N	3·3	10·0	795	4·4	1·9
	1911	520	64	14·5	7,500*	2	QE	4	82	738	37·0	5 DC	210	N	3·25	11·75	1,750	4·25	1·6
	1914	550	66	16·5	11,000§	2	GT	—	133	1,650P	—	5 DC	210	H	2·5	17·5	1,800	6·1	1·4
	1920	550	66	17·0	11,000§	2	GT	—	85	{3,200 2,000}Q	—	5 Wz	250	OD	2·25	—	1,210	9·1	0·9a
Cargo steamers	1877	314	35	11·25	775*	1	FC	—	52	450	23	1 OC	70	N	4·46	7·6	200	3·87	2·5
	1885	320	38	12·25	1,650*	1	TE	—	70	560	31·5	2 C	150	N	2·82	10·4	340	4·85	1·95
	1911	440	52	13·25	4,200*	1	TE	—	73	750	35	2 C	190	FD	2·8	16·25	900	4·67	1·65
	1914	450	56	14·25	5,000§	1	GT	—	102	1,350P	—	2 C	195	H	2·30	20·0	930	6·45	1·45
	1920	503	63	14·25	7,000§	2	DT	—	80	{3,500 1,800}Q	—	3 FCz	200	OD	2·25	—	1,100	6·35	0·85a
Cross-Channel Steamers	1890	300	35	18·00	4,400*	2	TE	3	130	780	30·75	5 C	160	N	2·6	12·25	590	7·45	2·25
	1898	315	37	19·75	5,520*	2	TE	4	165	910	43·0	4 C	180	FD	1·95	17·5	610	9·62	2·1
	1904	330	42	19·5	5,500§	3	T	—	550	550P	—	2DC&1C	150	FD	1·9	16·5	590	9·3	1·8
	1910	316	41	21·5	8,500§	3	T	—	625	625P	—	7 W	190	FD	1·95	15·0	735	11·6	1·7
	1920	302	36	23·5	12,300§	2	GT	—	435	{2,600 1,800}Q	—	8 W	195	FD	2·00	22·0	1,055	11·65	1·5
	1925	329	45	22·25	—	2	GT	—	270	—	—	5 W	200	FD	—	—	—	—	—
Motor ships	1909	210	38	8·5	490*	1	4 S	6	140	550	99y	Steam auxiliaries		—	—	—	91	4·3ƚ	0·6a
	1910	260	43	10·5	1,460*	1	4 S	6	125	820	111y	,,	,,	—	—	—	220	5·0ƚ	0·5a
	1912	380	53	11·0	2,500*	2	4 S	8	140	670	89·8y	Electric	,,	—	—	—	390	4·8ƚ	0·47a
	1914	425	55	11·25	3,100*	2	4 S	6	125	785	89·5y	,,	,,	—	—	—	475	4·9ƚ	0·45a
	1916	450	57	12·0	4,000*	2	4 S	6	100	725	91·0y	,,	,,	—	—	—	600	5·0ƚ	0·45a
	1922	502	62	13·5	6,400*	2	4 S	8	115	865	91·5y	,,	,,	—	—	—	940	5·1ƚ	0·45a
	1924	580	72	18·5	17,500*	4	2 S	6	135	880	93·0y	Steam	,,	—	—	—	2,350	—	0·48a
	1926	630	79	17·0	20,000	2	4 D	8	125	1,229	83·0y	Electric	,,	—	—	—	5,000	5·0	0·43a
	1927	711	82½	20·0	25,000	4	2 D	6	120	950	—	,,	,,	—	—	—	—	—	—

* C = Vertical Compound; F.C. = Tandem Compound with flywheel; TE = triple expansion; QE = quadruple expansion; T = turbines; GT = geared turbines; DT = double-reduction geared turbines; ED = electric drive; 4S = 4-cycle single acting motors; 4D = 4-cycle double-acting motors; 2S = 2-cycle single acting motors.
† C = cylindrical; OC = oval ends and cylindrical middle portion; DC = double-ended cylindrical; FC = oil-fired cylindrical; W = water-tube (oil-fired).
‡ N = natural draught; AD = assisted draught; CS = closed stokehold; FD = forced draught; H = Howden's forced draught; OD = oil-burning with forced draught.
* I.H.P. § S.H.P. ƚ B.H.P. P turbine revs. per min. Q turbine revs. per min., H.P. and L.P. respectively.
z with superheaters. a Oil. y Mean Pressures for motorships are on I.H.P. basis.

NUMBERS OF MERCHANT VESSELS USING THE VARIOUS TYPES OF PROPULSION.*

(Excluding vessels of less than 100 tons gross.) As at June, 1931.

Country.	Oil Engines.	Steam Turbines.	Steam Recipro-cating Engines.	Auxiliary Steam Engines.	Auxiliary Oil Engines.	Sails.	Totals.
Great Britain and Ireland	490	329	6,887	1	74	376	8,157
British Dominions	204	25	1,833	3	94	370	2,529
British Empire	694	354	8,720	4	168	746	10,686
United States	274	552	1,876	—	27	584	3.313
Belgium	21	13	199	—	1	4	238
Denmark	105	15	477	2	78	40	717
France	60	72	1,351	1	37	132	1,653
Germany	198	63	1,621	5	264	20	2,171
Greece	2	—	526	—	11	—	539
Holland	335	61	901	—	113	19	1,429
Italy	123	53	851	3	71	246	1,347
Japan	183	46	1,562	64	114	—	1,969
Norway	345	9	1,557	16	54	9	1,990
Spain	57	11	648	6	49	71	842
Sweden	151	12	1,042	2	132	89	1,428
Other Countries	266	11	2,639	3	132	397	3,448
Total	2,814	1,272	23,970	106	1,251	2,357	31,770

* Excluding American Great Lakes vessels and Japanese sailing vessels.

COMPARISON OF RUNNING COSTS OF STEAM- AND MOTORSHIPS.

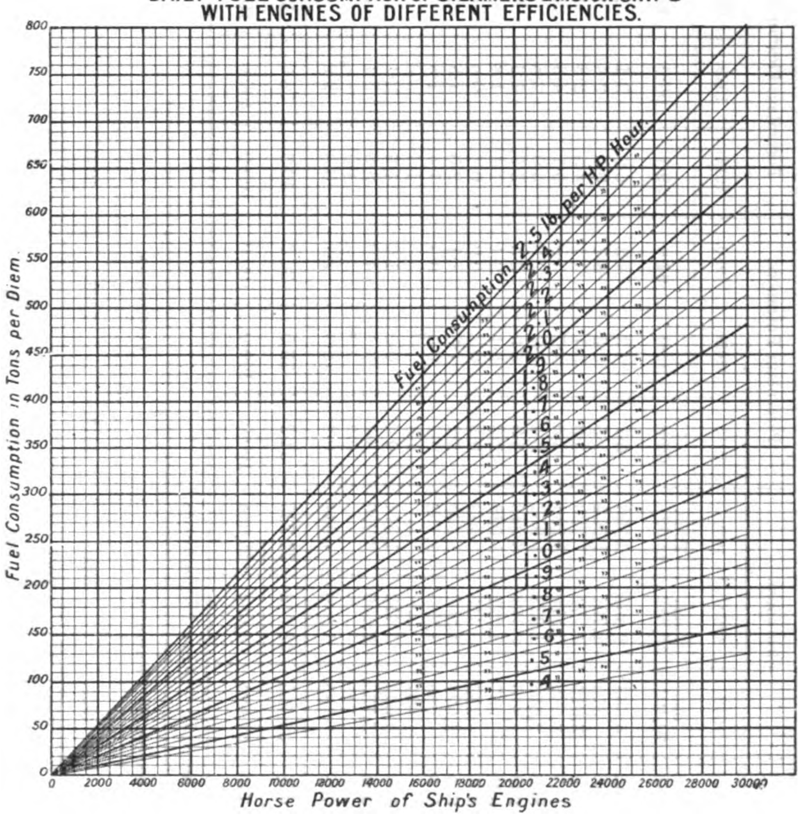
Deadweight Capacity, 8,000 Tons. Speed, 10½ Knots. Voyage, 30 Days.

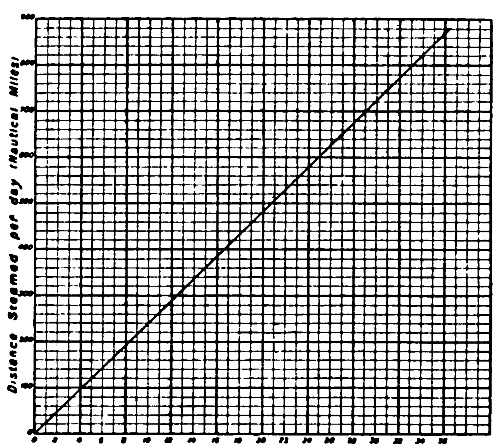
Type of Machinery	S.S. Diesel 2,200 B.H.P.	S.S. Geared Turbines. 2,200 S.H.P.	S.S. Recip. 2,500 I.H.P.	S.S. Recip. Bauer Wach 2,500 I.H.P.
Fuel	Oil.	Coal.	Coal.	Coal.
Fuel 163/h.p. hour	0·4	1·56	1·65	1·25
,, tons day	9·4	36·7	44·2	33½
,, voyage	282	1,101	1,326	1,005
Price, fuel/ton	£3 5*s*.	£1 5*s*.	£1 5*s*.	£1 5*s*.
Cost/voyage	£916 10*s*.	£1,376 5*s*.	£1,657 10*s*.	£1,256 5*s*.
Lub. oil, galls./day	14	6	4	6
,, cost/gall.	2*s*. 2*d*.	2*s*. 2*d*.	1*s*. 9*d*.	2*s*. 2*d*.
,, voyage	£45	£19 10*s*.	£10 10*s*.	£19 10*s*.
E.R. staff	8	21	21	21
Wages/voyage	£151	£228 10*s*.	£228 10*s*.	£228 10*s*.
Provision/voyage	£30	£78 15*s*.	£78 15*s*.	£78 15*s*.
Wages, fuel, lub. oil, and provisions/voyage	£1,132 10*s*.	£1,703	£1,975 5*s*.	£1,583
Running costs—Ratio	1	1·5	1·74	1·4
Comparative cost—Fuel winches/harbour	£28 10*s*. (electric)	£96 5*s*. (steam)	£96 5*s*. (steam)	£96 5*s*. (steam)

NOTABLE MOTORSHIPS.

Date.	Name.	Gross tonnage.	Dimensions. (ft.)	Owners.	Builders.	Machinery makers.	Type of engine.	Cycle.	No. of eng.	Total B.H.P.	Revs. per min.
1912	Juno	2,345	257·6 × 43·1 × 18·6	Nederl. Indische Tankstoomboot Maats.	Nederl. Schs. Maats.	Werkspoor	Werkspoor	4 single act.	1	1,100	125
1918	Aba	7,937	450·5 × 55·8 × 36·6	Elder Dempster	Barclay, Curle and Co.	Harland & Wolff	B. & W.	4 single act.	2	5,250	115
1922	Pacific Commerce	5,089	420·0 × 54·0 × 25·0	Furness Withy	Wm. Doxford and Sons	Doxford	Doxford	2 opposed pistons	1	2,700	77
1923	Brazza	10,193	453·1 × 59·1 × 36·1	Chargeurs Réunis	Atel. & Ch. de la Loire	Sulzer	Sulzer	2 single act.	2	3,400	85
1924	Dolius	5,994	407·0 × 52·2 × 28·4	A. Holt & Co.	Scott's S.B. & E. Co.	Scott's S.B. & E. Co.	Still	2 double act.	2	2,500	120
1924	Aorangi	17,491	580·1 × 72·2 × 43·4	Canadian Australasian Line	Fairfield S.B. & E. Co.	Fairfield S.B. & E. Co.	Sulzer	2 single act.	4	13,000	135
1925	Gripsholm	17,716	553·0 × 74·4 × 37·7	Swedish-America Line	Armstrong Whitworth & Co.	Burmeister & Wain	B. & W.	4 double act.	2	13,500	125
1925	Asturias	22,071	630·5 × 78·5 × 40·5	Royal Mail	Harland & Wolff	Harland & Wolff	B. & W.	4 double act.	2	16,500	125
1926	Carnarvon Castle	20,063	630·7 × 73·5 × 41·5	Union Castle	Harland & Wolff	Harland & Wolff	B. & W.	4 double act.	2	13,000	105
1926	Saturnia	23,940	631·4 × 79·8 × 29·5	Cosulich Line	C.N. Triestino	Stab. Tec. Triestino	B. & W.	4 dbl. act. with super chargers	2	20,000	125
1926	Vulcania	23,970	631·4 × 79·8 × 24·4	Cosulich Line	C.N. Triestino	Stab. Tec. Triestino	B. & W.	4 dbl. act. with super chargers	2	20,000	125
1927	Augustus	32,650	710·9 × 82·8 × 46·5	Nav. Gen. Italiana	Soc. Anon. Ansaldo	M.A.N. & Cant. Off. Savoia	M.A.N.	2 double act.	4	25,000	120
1927	Bermuda	19,086	525·9 × 74·1 × 39·6	Bermuda & W. Indies S.S. Co.	Workman, Clark & Co.	Doxford	Doxford	2 opposed pistons	4	11,200	110
1928	Kungsholm	20,223	594·9 × 78·2 × 37·8	Swedish-America Line	Blohm & Voss	Burmeister & Wain	B. & W.	4 double act.	2	15,000	100
1930	Britannic	26,943	683·6 × 82·4 × 48·6	White Star Line	Harland & Wolff	Harland & Wolff	B. & W.	4 double act.	2	20,000	110

DAILY FUEL CONSUMPTION OF STEAMERS & MOTOR SHIPS WITH ENGINES OF DIFFERENT EFFICIENCIES.





DISTANCE STEAMED IN ONE DAY BY SHIPS OF DIFFERENT SPEEDS.

NATIONALITY AND NET TONNAGE OF VESSELS WHICH ENTERED AND CLEARED WITH CARGOES IN THE FOREIGN TRADE OF THE UNITED KINGDOM FOR THE YEARS 1913, 1929, AND 1930.

(Thousands of Net Tons).

Nationalty.	Entrances.			Clearances.			Percentage Entrances.			Percentage Clearances.		
	1913.	1929.	1930.	1913.	1929.	1930.	1913.	1929.	1930.	1913.	1929.	1930.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.						
British	32,292	40,748	40,787	40,101	45,342	42,621	65·8	65·0	64·0	59·1	66·0	64·7
Foreign :—												
Norwegian	3,285	2,729	2,705	4,683	2,362	2,196	6·7	4·3	4·2	6·9	3·4	3·3
American	724	3,314	2,995	370	1,761	1,504	1·5	5·3	4·7	0·5	2·6	2·3
Swedish	1,891	1,849	1,949	3,016	1,771	1,720	3·9	3·1	3·1	4·5	2·6	2·6
Dutch	1,702	2,968	3,157	2,536	3,179	3,266	3·5	4·7	5·0	3·7	4·6	5·0
Danish	1,161	1,666	1,866	2,613	1,923	1,952	2·4	2·7	2·9	3·9	2·8	3·0
French	999	2,273	2,230	1,975	3,192	3,242	2·0	3·6	3·5	2·9	4·6	4·9
Belgian	1,369	1,317	1,321	957	1,222	1,098	2·8	2·1	2·1	1·4	1·8	1·7
Japanese	140	466	551	282	413	453	0·3	0·7	0·9	0·4	0·6	0·7
Spanish	1,060	793	674	1,694	1,207	1,325	2·2	1·3	1·1	2·5	1·8	2·0
Italian	122	403	576	955	1,255	1,162	0·2	0·6	0·9	1·4	1·8	1·8
Russian*	678	—*	—	937	—*	—	1·4	—*	—	1·4	—*	—
Greek	221	566	638	1,072	1,413	1,314	0·4	0·9	1·0	1·6	2·1	2·0
German	3,166	2,141	2,558	5,730	2,106	2,056	6·4	3·4	4·0	8·5	3·1	3·1
Austro-Hungarian*	128	—*	—	715	—*	—	0·3	—*	—	1·0	—*	—
Other Nationalities	125	1,470	1,708	185	1,539	1,944	0·2	2·3	2·7	0·3	2·2	3·0
Total Foreign	16,772	21,954	22,928	27,720	23,342	23,233	34·2	35·0	36·0	40·9	34·0	35·3
Total British and Foreign	49,064	62,701	63,715	67,821	68,684	65,854	100·0	100·0	100·0	100·0	100·0	100·0

* Included in "Other Nationalities."

	Entrances and Clearances.			Percentages.		
	1913.	1929.	1930.	1913.	1929.	1930.
	Tons.	Tons.	Tons			
British	72,393	86,090	83,408	62	66	64
Foreign	44,492	45,296	46,161	38	34	36
Total	116,885	131,386	129,569	100	100	100

ENTRANCES AND CLEARANCES IN THE FOREIGN TRADE OF THE UNDERMENTIONED COUNTRIES FOR THE YEARS 1913, 1929, AND 1930.

Note.—C=With Cargo only. C & B=With Cargo and in Ballast.

Countries.		Entrances.			Clearances.		
		1913.	1929.	1930.	1913.	1929.	1930.
		Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.
United Kingdom	C	49,068	62,692	63,720	67,824	68,696	65,856
United States of America	C & B	53,280	59,476*	59,712*	53,796	65,043*	63,312*
France	C	34,512	58,092	60,996	26,112	49,193	51,048
Japan	C & B	24,720	55,200	56,436	24,900	55,389	56,328
Netherlands	C	17,148	25,519	26,856	11,016	17,461	20,748
Spain	C & B.	25,788	33,624	34,008	28,992	32,743	33,576
British India	C	6,700	8,222	8,184	8,256	8,824	8,304
Australia	C & B.	5,364	5,624	5,448	5,232	5,598	5,496
South Africa	C & B	5,352	5,234	5,412	5,280	5,245	5,448
Norway	C	3,756	4,225	4,260	4,740	6,407	5,916
Belgium	C & B	16,908	29,715	29,112	16,896	29,590	28,968
Sweden	C	13,764	13,213	13,596	17,004	15,500	14,664
Germany	C	26,580	35,369	34,176	26,640	28,218	28,908

Above as Percentages of 1913 Figures.

United Kingdom	100	128	130	100	101	97
United States of America	100	112*	112*	100	121*	118*
France	100	168	177	100	188	195
Japan	100	223	228	100	222	226
Netherlands	100	149	157	100	159	188
Spain	100	130	132	100	113	116
British India	100	123	122	100	107	101
Australia	100	105	102	100	107	105
South Africa	100	98	101	100	99	103
Norway	100	124	113	100	135	125
Belgium	100	176	172	100	175	171
Sweden	100	96	99	100	91	86
Germany	100	133	129	100	106	109

* With cargo only.

NUMBER AND NET TONNAGE OF VESSELS THAT PASSED THROUGH THE SUEZ CANAL IN THE YEARS 1913, 1923, 1929, AND 1930, DISTINGUISHING THE PRINCIPAL NATIONALITIES.

Nationality of Vessels.	Number of Passages.				Net Tonnage of Vessels.				Numbers as Percentages of Total.				Tonnages as Percentages of Total.			
	1913.	1923.	1929.	1930.	1913.	1923.	1929.	1930.	1913.	1923.	1929.	1930.	1913.	1923.	1929.	1930.
British	2951	2839	3517	3125	12,052,484	14,264,214	19,114,282	17,600,483	58·0	61·5	56·0	54·2	60·2	62·8	57·1	55·6
Japanese . . .	68	172	163	156	343,732	986,283	951,510	938,700	1·3	3·7	2·6	2·7	1·7	4·4	2·8	3·0
Dutch	342	451	653	591	1,287,354	2,178,058	3,544,416	3,312,531	6·7	9·8	10·4	10·3	6·4	9·6	10·6	10·5
French . . .	256	259	399	357	927,787	1,294,400	2,165,511	2,001,837	5·0	5·6	6·4	6·2	4·6	5·7	6·5	6·3
Italian	110	256	319	307	290,576	1,042,754	1,524,890	1,502,559	2·2	5·6	5·1	5·3	1·5	4·6	4·5	4·7
Danish	56	64	84	83	171,848	299,695	403,603	431,965	1·1	1·4	1·3	1·4	0·9	1·3	1·2	1·4
Norwegian . . .	44	87	148	193	93,313	335,597	701,881	965,827	0·9	1·9	2·4	3·4	0·5	1·5	2·1	3·1
American (U.S.) .	8	114	118	106	7,476	614,128	705,155	670,391	0·2	2·5	1·9	1·8	—	2·7	2·1	2·1
Swedish . . .	33	60	76	73	122,957	275,264	367,767	354,266	0·7	1·3	1·2	1·3	0·6	1·2	1·1	1·1
Greek	17	20	68	54	54,560	61,031	187,492	95,363	0·3	0·4	1·1	0·9	0·3	0·3	0·6	0·3
Spanish . .	26	13	6	3	75,643	36,718	17,800	9,032	0·5	0·3	0·1	0·1	0·4	0·2	0·1	0·0
German . . .	778	247	620	600	3,352,287	1,213,691	3,455,402	3,388,842	15·3	5·4	9·9	10·4	16·7	5·4	10·3	10·7
Austria-Hungarian	246	—	—	—	845,830	—	—	—	4·8	—	—	—	4·2	—	—	—
Russian. . . .	110	23	33	46	340,595	73,896	104,044	129,554	2·2	0·5	0·5	0·8	1·7	0·3	0·3	0·4
All others . . .	40	16	70	67	67,422	54,433	222,261	267,409	0·8	0·1	1·1	1·2	0·3	0·0	0·7	0·8
Total . .	5085	4621	6274	5761	20,033,802	22,730,162	33,466,014	31,668,759	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

NOTE.—The above figures include not only Merchant Vessels and Mail Steamers, but also Warships and Transports as well as Government Chartered Vessels.

Number and Net Tonnage of Commercial Vessels that passed through the Panama Canal in the Years ended 30th June, 1920, 1922, 1924, 1926, 1928, 1929, 1930, and 1931, distinguishing the Principal Nationalities.

Note.—Commercial Vessels include all Vessels except those of the United States Government, or chartered by the U.S. Government to carry Government supplies, and Vessels of less than 10 tons measurement.

Nationality.	Number of Vessels.								Net Tonnage of Vessels.							
	1920.	1922.	1924.	1926.	1928.	1929.	1930.	1931.	1920.	1922.	1924.	1926.	1928.	1929.	1930.	1931.
British	753	935	1,265	1,423	1,842	1,783	1,536	1,390	2,760,188	3,795,526	6,097,611	7,039,542	8,976,960	8,994,526	8,006,962	7,518,171
American (U.S.A.)*	1,129	1,095	2,947	2,432	2,753	2,700	2,885	2,417	3,791,088	4,971,509	15,806,899	12,565,255	13,752,957	13,325,753	14,534,495	12,601,828
German	—	—	—	—	—	—	377	369	—	—	—	—	—	—	1,433,074†	1,412,256†
Norwegian	106	113	136	306	313	340	371	363	397,632	385,007	546,633	987,040	1,181,189	1,280,184	1,660,101	1,748,728
Japanese	118	189	171	131	188	155	163	193	515,243	872,466	815,468	946,028	909,232	775,005	803,182	1,019,832
Chilian	79	53	47	26	32	31	46	42	212,000	150,398	176,472	121,901	124,959	130,599	164,152	170,928
Danish	9	53	65	63	69	101	91	120	32,221	227,473	245,929	234,753	285,396	416,985	381,766	611,380
Peruvian	75	60	70	64	53	48	2	2	191,689	161,930	189,046	149,162	140,323	109,100	8,959	7,088
Dutch	29	66	102	93	137	149	141	125	152,535	293,428	551,761	530,652	644,390	690,608	671,250	578,680
French	60	51	83	90	127	115	124	110	114,664	190,171	386,640	421,752	580,769	534,505	627,760	609,915
Spanish	41	9	45	31	46	32	2	9	106,651	27,264	172,572	121,461	157,465	117,528	4,209	22,650
Other Nationalities	79	112	299	538	896	959	447	389	272,133	342,287	1,159,847	1,657,045	2,704,894	3,463,001	1,684,704	1,490,690
Totals	2,478	2,736	5,230	5,197	6,456	6,413	6,185	5,529	8,546,044	11,417,459	26,148,878	24,774,591	29,458,634	29,837,794	29,980,614	27,792,146

Above as Percentages.

	1920.	1922.	1924.	1926.	1928.	1929.	1930.	1931.	1920.	1922.	1924.	1926.	1928.	1929.	1930.	1931.
British	30·4	34·2	24·2	27·4	28·6	27·8	24·8	25·1	32·3	33·3	23·3	28·4	30·4	30·1	26·7	27·0
American (U.S.A.)*	45·6	40·0	56·3	46·8	42·6	42·1	46·7	43·7	44·4	43·5	60·5	50·7	46·7	44·7	48·5	45·3
German†	—	—	—	—	—	—	6·1	6·7	—	—	—	—	—	—	4·8	5·1
Norwegian	4·3	4·1	2·6	5·9	4·8	5·3	6·0	6·6	4·7	3·4	2·1	4·0	4·0	4·3	5·5	6·3
Japanese	4·8	6·9	3·3	2·5	2·9	2·4	2·6	3·5	6·0	7·6	3·1	3·8	3·1	2·6	2·7	3·7
Chilian	3·2	2·0	0·8	5·0	0·5	0·5	0·8	0·8	2·5	1·3	0·7	0·5	0·5	0·4	0·6	0·6
Danish	0·3	2·0	1·2	1·2	1·1	1·6	1·5	2·2	0·4	2·0	0·9	1·0	1·0	1·4	1·3	2·2
Peruvian	3·0	2·2	1·3	1·2	0·8	0·7	0·0	0·0	2·2	1·4	0·7	0·6	0·5	0·4	0·0	0·0
Dutch	1·2	2·4	2·0	1·8	2·1	2·3	2·3	2·2	1·8	2·6	2·1	2·1	2·2	2·3	2·2	2·1
French	2·4	1·8	1·6	1·7	2·0	1·8	2·0	2·0	1·3	1·7	1·5	1·7	2·0	1·8	2·1	2·2
Spanish	1·6	0·3	0·9	6·0	0·7	0·5	0·0	0·2	1·2	0·2	0·7	0·5	0·5	0·4	0·0	0·1
Other Nationalities	3·2	4·1	5·8	0·5	13·9	15·0	7·2	7·0	3·2	3·0	4·4	6·7	9·1	11·6	5·6	5·4
Totals	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

* Includes Vessels engaged in the coasting trade of the U.S.A., which is carried on *entirely* by National Ships.
† Included with "Other Nationalities" in previous years.

CARGOES (IN TONS WEIGHT) CARRIED IN COMMERCIAL VESSELS THAT PASSED THROUGH THE PANAMA CANAL DURING THE YEARS ENDED 30TH JUNE, 1920, 1922, 1924, 1926, 1928, 1929, 1930, AND 1931, DISTINGUISHING THE PRINCIPAL NATIONALITIES.

Nationality of Vessels.	Weight of Cargoes carried.							
	1920.	1922.	1924.	1926.	1928.	1929.	1930.	1931.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
British . .	2,830,268	3,329,861	6,051,842	6,750,843	8,075,022	8,331,221	7,572,969	5,971,281
American (U.S.A.)	4,547,140	4,950,519	16,654,435	13,710,956	14,258,735	14,075,731	14,499,233	11,805,132
German .	—	—	—	—	—	—	1,388,022*	1,261,763*
Norwegian .	404,323	408,268	539,101	1,051,276	1,268,124	1,505,366	1,808,278	1,720,383
Japanese .	726,338	1,044,515	935,245	667,982	1,041,166	980,041	1,009,735	1,104,512
Chilian . .	104,738	46,182	107,147	82,695	81,678	98,584	105,511	99,234
Danish .	42,533	272,779	317,274	295,530	380,240	518,452	505,914	606,100
Peruvian .	119,418	64,370	102,136	94,778	96,175	69,573	13,107	7,328
Dutch .	128,442	290,573	573,929	552,741	637,178	695,956	618,718	477,769
French . .	125,249	139,463	407,249	398,393	600,421	530,763	576,753	508,011
Spanish . .	101,563	23,701	67,903	49,956	104,606	95,405	8,250	27,030
Other Nationalities .	244,487	314,679	1,238,449	2,382,298	3,097,364	3,761,914	1,923,742	1,494,257
Totals .	9,374,499	10.884,910	26,994,710	26,037,448	29,630,709	30,663,006	30,080,232	25,082,800

ABOVE AS PERCENTAGES.

	1920	1922.	1924.	1926.	1928.	1929.	1930.	1931.
British . .	30·2	30·6	22·4	25·9	27·2	27·1	25·2	23·8
American (U.S.A.)	48·5	45·5	61·7	52·7	48·2	45·9	48·3	47·1
German .	—	—	—	—	—	—	4·6*	5·0*
Norwegian .	4·3	3·7	2·0	4·0	4·3	4·9	6·0	6·9
Japanese .	7·7	9·6	3·5	2·6	3·5	3·2	3·4	4·4
Chilian . .	1·1	0·4	0·4	0·3	0·3	0·3	0·4	0·4
Danish . .	0·5	2·5	1·2	1·1	1·3	1·7	1·7	2·4
Peruvian .	1·3	0·6	0·4	0·4	0·3	0·2	0·0	0·0
Dutch . .	1·4	2·7	2·1	2·1	2·2	2·3	2·1	1·9
French . .	1·3	1·3	1·5	1·5	2·0	1·7	1·9	2·0
Spanish . .	1·1	0·2	0·3	0·2	0·3	0·3	0·0	0·1
Other Nationalities	2·6	2·9	4·5	9·2	10·4	12·4	6·4	6·0
Totals	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

* Included with "Other Nationalities" in previous years.

FREIGHT RATES.

ESTIMATED AVERAGE RATES OF FREIGHT FOR STEAMERS IN THE OPEN MARKET, FOR VARIOUS YEARS.

OUTWARD.
From Tyne and N.E. Coast ports.

To	1920. s.	1920. d.	1921. s.	1921. d.	1924. s.	1924. d.	1928. s.	1928. d.	1929. s.	1929. d.	1930. s.	1930. d.
River Plate	—		19	10	13	0	12	3	15	5½	14	2
Port Said	41	3	15	4	10	11½	10	4½	11	0	7	2
Alexandria	—		16	11	11	5	10	4	11	10½	7	5¾
Barcelona	34	0	16	8	12	5½	11	11¾	13	5	9	6¾
Oporto	46	6	16	6	13	0	8	7	9	9¾	8	2¾
Canary Islands	—		12	10	9	1⅛	8	7	9	8¾	7	10¾
Bordeaux	38	10	8	11	5	10	5	5¾	6	8	4	11
Bilbao	—		12	10	7	11	8	0½	9	6¾	6	10½
Stockholm	—		10	7	5	11	—		6	2	4	5½
Rotterdam	17	3½	8	7	4	3	3	11½	4	3¼	3	4¼
Hamburg	10	3	6	10⅛	4	5	—		—		3	6
Algiers	51	5	13	2	9	4	8	5	9	6	7	3¾

HOMEWARD.
To U.K. or Continent, except where otherwise stated.

From	1920. s.	1920. d.	1921. s.	1921. d.	1924. s.	1924. d.	1928. s.	1928. d.	1929. s.	1929. d.	1930. s.	1930. d.
River Plate (Lower Ports)	118	6	35	8	23	9¼	20	1¼	20	10¾	12	4¾
River Plate (San Lorenzo)	125	0	45	1	25	9¾	22	2	22	0¼	15	4
Gulf (per quarter)	12	4	6	10¼	4	5¼	4	2¾	2	9½	2	6¼
Calcutta	106	10	25	0	30	1	—		—		—	
Karachi	84	6	28	4	23	8½	22	6¼	—		14	0½
Rice Ports	112	0	34	2	32	8¾	26	4	26	4½	18	2¼
Bombay (d.w.)	86	0	24	10	26	1¾	19	3½	22	0¾	18	10½
Odessa, etc. (direct)	—		—		14	10	11	7¾	13	9¼	11	4½
Danube	60	2	25	10	19	10¾	14	7	17	11¾	14	4¾
Sulina (direct)	56	0	—		15	10½	11	2½	13	0½	10	10¼
Bilbao *	25	1¾	10	2	6	8	6	0½	6	6¾	5	2¾
Huelva	28	1	10	8	8	5½	8	8	9	7½	7	5½

* To Tyne.

"LAID-UP" STEAM TONNAGE OF PRINCIPAL MARITIME COUNTRIES.

	Jan. 1st, 1926.	Jan. 1st, 1927.	Jan. 1st, 1928.	Jan. 1st, 1929.	Jan. 1st, 1930.	July 1st, 1930.	Jan. 1st, 1931.	July 1st, 1931.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Gt. Brit. & Ireland	613,000	529,000	575,000	528,000	564,000	1,470,000	2,549,000	3,271,000
Australia . . .	51,000	71,000	†	†	†	120,000	†	141,000
United States :—								
Shipping Board .	3,518,000	2,336,000	2,405,000	2,144,000	1,588,000	1,509,000	1,443,000	1,295,000
Ship. Bd. Tankers	134,000	56,000	†	†	†	†	†	†
Govt. owned, other than U.S. S. Bd.	16,000	27,000	†	†	†	†	†	†
Privately owned .	458,000	457,000	726,000	818,000	666,000	587,000	1,216,000	1,255,000
U.S. total .	4,120,000	2,876,000	3,131,000	2,962,000	2,254,000	2,096,000	2,659,000	2,550,000
Belgium . . .	21,000	14,000§	†	†	†	†	†	106,000
Denmark . . .	63,000	20,000	†	†	†	†	131,000	148,000
France	134,000	118,000	177,000	133,000	90,000	160,000	219,000	567,000
Greece	99,000	106,000§	77,000	74,000	87,000	290,000	223,000	†
Holland . . .	109,000	3,000	16,000	9,000	4,000	193,000	324,000	†
Italy	225,000	110,000	312,000	250,000	170,000	450,000	649,000	760,000
Japan	35,000	48,000	49,000	46,000	44,000	43,000	323,000	196,000
Norway . . .	22,000	37,000§	136,000	19,000	13,000	174,000	572,000	817,000
Spain	44,000	35,000	52,000	31,000	25,000	76,000	102,000	†
Sweden . . .	30,000	9,000	28,000	2,000	2,000	12,000	106,000	118,000
Other Countries ‡ .	279,000	100,000	†	†	†	†	†	†
World's total .	5,845,000	4,076,000	4,553,000	4,054,000	3,253,000	5,084,000	7,857,000	8,674,000

† No data available. ‡ Mainly belonging to countries shown above.
§ Figures at October, 1926, available only.

PAY IN THE MERCHANT SERVICE.—Monthly Rates.

*Foreign-going Cargo Steamers.**

Rating.	1914.	1924.†	1925–31.‡
	£ s. £ s.	£ s. £ s.	£ s. £ s.
First Mates . . .	12 5 to 14 5	17 10 to 26 10	16 0 to 25 0
Second Mates . .	9 5 „ 12 15	15 0 „ 18 10	13 10 „ 17 0
Third Mates . .	7 10 „ 10 10	13 0 „ 14 0	11 10 „ 12 10
Chief Engineers .	16 15 „ 24 0	21 10 „ 34 10	20 0 „ 33 0
Second Engineers .	12 5 „ 14 15	17 10 „ 26 10	16 0 „ 25 0
Third Engineers	8 15 „ 11 15	15 0 „ 18 10	13 10 „ 17 0
Carpenters . . .	7 0 „ 7 10	12 10 „ 16 10	11 10 to 15 10
Boatswains . . .	6 5 „ 6 10	11 10 (Fixed rate.)	10 10 (Fixed rate.)
Firemen	5 10 „ 6 0	10 10 „	9 10 „
Able Seamen . .	5 0 „ 5 10	10 0 „	9 0 „

* On Oil-Tank Vessels the rates are supplemented by the following percentage additions :—

Chief Engineers . . . . 12½ per cent.
First Mates and Second Engineers . . . . . 10 „
Other Mates and Engineers . . . . 7½ „

On Motor Vessels there is a special National Standard Scale of Pay for Engineer Officers substantially higher than on steam-driven vessels.

† The 1924 figures are the National Maritime Board standard rates of pay, effective from September 5, 1924, and based, in the case of Navigating and Engineer Officers, on tonnage and seniority.

‡ The rates payable to Navigating and Engineer Officers are subject to a reduction of 10 per cent. as from January 31, 1932.

On Passenger Liners, Navigating and Engineer Officers, as a rule, receive now, as before the War, wages from 10 to 20 per cent. higher than the Standard Cargo-Vessel rates.

EXPORTS OF NEW SHIPS FROM THE UNITED KINGDOM.

Ships not Registered as British, with their Machinery.

Year.	War Vessels (including Machinery and Armament).	Steam Ships (other than War Vessels).		Sailing Ships (other than War Vessels) including Boats.	Total of New Ships.
		Hulls and Fittings.	Machinery.		
	£	£	£	£	£
1903	74,480	2,798,737	1,222,108	188,504	4,283,829
1904	388,600	2,570,835	1,164,779	330,937	4,455,151
1905	50,000	3,693,422	1,516,183	171,693	5,431,298
1906	2,800,000	3,973,873	1,668,592	201,706	8,644,171
1907	554,700	6,586,449	2,550,702	326,262	10,018,113
1908	1,879,994	5,902,428	2,505,280	189,773	10,567,475
1909	247,000	3,698,556	1,819,618	161,940	5,927,114
1910	4,894,500	2,553,427	1,209,119	113,158	8,770,204
1911	25,000	3,745,349	1,632,402	259,564	5,663,115
1912	765,000	4,243,308	1,750,351	268,503	7,027,162
1913	2,617,100	5,867,179	2,336,509	205,742	11,026,530
1914	308,385	4,716,226	1,784,900	123,043	6,932,554
1915	—	1,170,606	472,597	49,548	1,692,661
1916	20,000	754,372	481,703	34,510	1,290,585
1917	—	706,084	347,354	33,869	1,087,307
1918	—	778,525	229,292	39,517	1,047,334
1919	—	1,703,961	505,652	118,718	2,328,331
1920	—	26,280,243		295,771	26,576,016
1921	—	29,523,833		470,615	29,994,448
1922	—	30,222,080		220,435	30,442,515
1923	—	9,566,187		148,474	9,714,661
1924	—	5,257,957		264,388	5,522,345
1925	14,354	5,996,585		265,384	6,276,323
1926	19,300	4,314,414		296,265	4,629,979
1927	45,388	4,233,509		251,758	4,530,655
1928	5,143,150	10,439,794		315,630	15,575,749
1929	3,820,250	11,487,076		203,840	15,511,166
1930	707,400	18,843,978		343,708	19,895,086

HIGHEST AND LOWEST IRON AND STEEL PRICES, 1914–1930.

	1914.	1918.	1920.	1924.	1928.	1930.	1931.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Marked Iron Bars, S. Staffs	9 0 0	20 0 0	33 10 0	15 0 0	12 10 0	12 10 0	12 0 0
	8 10 0	14 15 0	26 15 0	14 10 0	12 0 0		
Common Iron Bars, Cleveland	8 2 6	20 0 0	30 0 0	12 10 0	10 5 0	10 15 0	10 10 0
	7 10 0	14 15 0	24 5 0	12 0 0	10 5 0		
Steel Ship Plates, $\frac{3}{8}$-in., Middlesbrough	7 10 0	16 10 0	24 10 0	10 10 0	8 2 6*	8 15 0*	8 15 0*
	7 0 0	11 10 0	20 0 0	9 10 0	8 7 6*		
Steel Ship Angles, Middlesbrough	7 5 0	16 2 6	24 0 0	10 0 0	7 12 6*	8 7 6*	8 7 6*
	6 15 0	11 2 6	19 10 0	9 5 0	7 17 6*		
Steel Ship Plates, Glasgow	7 5 0	16 10 0	28 5 0	12 10 0	8 2 6*	8 15 0*	8 15 0*
	6 17 6	11 10 0	21 10 0	9 15 0	8 7 6*		
Steel Ship Angles, Glasgow	7 0 0	18 2 6	26 10 0	10 0 0	7 12 6*	8 7 6*	8 7 6*
	6 7 6	11 2 6	19 10 0		7 17 6*		
Steel Boiler Plates, Middlesbrough	8 5 0	17 10 0	31 0 0	14 0 0	11 0 0	10 10 0	10 10 0
	8 0 0	12 10 0	23 0 0	13 0 0	11 10 0		
Steel Boiler Plates, Glasgow	7 5 0	17 10 0	31 10 0	14 0 0	10 10 0	10 10 0	10 10 0
	7 0 0	12 10 0	24 0 0	13 0 0	10 10 0		

* Subject to rebate.

FLUCTUATIONS IN COST OF A 7,500-TON (D.W.) CARGO STEAMER.†

Period.		Rate per ton (D W.)
	£	£
1900 (Nov.)	60,630*	8·4
1905 (June)	36,500	5·0
1908 (June)	**36,000**	4·9
1910 (Jan.)	39,000	5·3
1912 (Nov.)	58,000	7·7
1914 (June)	42,500	5·7
1915 (Jan.)	97,500	13·0
1916 (Jan.)	110,600	14·7
1920 (March)	**258,750**	34·5
1921 (Jan.)	225,000	30·0
1921 (June)	135,100	18·0
1922 (Jan.)	97,500	13·0
1922 (June)	75,000	10·0
1923 (Jan.)	67,500	9·0
1923 (June)	73,150	9·7
1924 (Jan.)	71,000	9·6
1924 (June)	75,000	10·0
1925 (Jan.)	68,750	9·2
1925 (June)	65,100	8·7
1926 (Jan.)	60,000	8·0
1926 (June)	60,000	8·0
1927 (Jan.)	64,500	8·6
1927 (June)	66,000	8·8
1928 (June)	65,000	8·7
1929 (Jan.)	66,500	8·9
1929 (June)	67,250	9·0
1930 (Jan.)	67,750	9·0
1930 (June)	67,750	9·0
1931 (Jan.)	67,750	9·0
1931 (June)	66,950	8·9

Based on figures given in "Fairplay," July 9, 1931.

Note.—The highest and lowest prices are given in heavy type.

*** Highest pre-War figure.**

† The figures are based on a single-deck steamer of very plain specification, built to Lloyd's Register latest rules, with no deep tank, donkey boiler, or Grain Act requirements; length 380 ft., breadth 49 ft., depth 29 ft., carrying 7500 tons deadweight at $10\frac{1}{2}$ knots on 23′ 8″ draught.

From 1898 to 1906 the vessel used was 360 ft. long by 48 ft. beam by 30′ 10″ depth, carrying 7000 to 7250 tons deadweight on 24′ 6″ draught. In 1906 the revised Board of Trade rules enabled the freeboard to be reduced, thus increasing the deadweight by 60 to 80 tons, while in 1910 changes in the Rules of Lloyd's Register of Shipping permitted of lighter scantlings, adding 150 tons to the deadweight.

OCEAN DISTANCES FROM THE BRITISH ISLES.
(Steaming Distances in Nautical Miles.)

I.—Continent.

	Archangel.	Christiania.	Copenhagen.	Stockholm.	Danzig.	Hamburg.	Amsterdam.	Rotterdam.	Antwerp.	Havre.	Bordeaux.	Bilbao.	Lisbon.	Gibraltar.
Cardiff .	2,259†	1,060*	1,126*	1,498*	1,400*	839	577	553	541	367	531	561	878	1,145
Glasgow .	2,036†	930†	996†	1,408†	1,280†	490	818	794	782	610	778	808	1,093	1,400
Liverpool .	2,104†	1,005†	1,066†	1,478†	1,340†	942	711	687	675	503	671	701	1,010	1,290
London .	2,106	702	700	1,180	989	427	188	177	180	198	682	712	1,058	1,325
Sunderland	1,755	520	586	998	860	413	258	266	327	397	896	915	1,225	1,615

* South about. † North about.

II.—Mediterranean, Black Sea and Red Sea.

	Marseilles.	Naples.	Messina.	Malta.	Genoa.	Trieste.	Athens.	Constantinople.	Odessa.	Batoum.	Smyrna.	Alexandria.	Port Said.	Aden.
Cardiff .	1,870	2,080	2,170	2,135	2,039	2,804	2,630	2,910	3,230	3,490	2,765	2,922	3,075	4,515
Glasgow .	2,085	2,295	2,475	2,350	2,254	3,019	2,864	3,125	3,445	3,705	2,980	3,137	3,300	4,730
Liverpool .	1,975	2,265	2,367	2,240	2,144	2,909	2,759	3,069	3,335	3,595	2,870	3,083	3,290	4,620
London .	2,050	2,260	2,354	2,315	2,219	2,984	2,810	3,190	3,410	3.670	2,945	3,122	3,248	4,695
Sunderland	2,222	2.540	2,520	2,511	2,381	3,164	2,990	3,370	3,690	3.950	3,225	3,382	3,445	4,975

III.—Africa and Eastern Atlantic, etc.

	Azores.	St. Vincent (C.V.I.)	Las Palmas.	Bathurst.*	Freetown.	Lagos.	Ascension.	Loanda.†	St. Helena.	Cape Town.	Durban.	Mauritius.‡	Melbourne ‡ (Australia).	Hobart ‡ (Tasmania).
Cardiff .	1,330	2,345	1,523	2,484	2,838	3,968	3,775	4,841	4,472	5,947	6,721	8,273	11,761	11,785
Glasgow .	1,495	2,560	1,745	2,706	3,059	4,189	3,940	5,056	4.637	6,168	6,942	8,494	11,982	12,006
Liverpool .	1,385	2,450	1,655	2,616	2,962	4,097	3,830	4,946	4.527	6,076	6.850	8,402	11,890	11,914
London .	1,460	2,525	1,699	2,660	3,008	4,138	3,900	5.021	4,597	6,117	6,891	8,443	11,931	11,955
Sunderland	1,740	2,805	1,890	2,851	3,199	4,329	4,185	5,301	4,882	6,308	7,082	8,834	12,122	12,146

* *Via* Teneriffe and Dakar. † *Via* St. Vincent (C.V.I.). ‡ *Via* Cape Town.

IV.—Indian Ocean, etc. (*via* Suez).

	Karachi.	Bombay.	Colombo.	Zanzibar.	Mauritius.	Madras.	Calcutta.	Rangoon.	Singapore.	Batavia.	Freemantle (W. Australia)	Adelaide.	Melbourne.	Hobart.
Cardiff .	5,930	6,150	6,615	6,195	6,825	7,016	7,610	7,845	8,165	8,450	9,745	10,712	11,070	11,100
Glasgow .	6,145	6,365	6.830	6,433	7,040	7,120	7,854	8,060	8,380	8,635	9,960	10,953	11,285	11,315
Liverpool .	6.135	6,255	6,720	6,220	6,930	7,065	7,750	7,955	8,270	8,555	9,850	10.847	11,175	11,330
London .	6.110	6,330	6.535	6,295	7,005	7,040	7,795	7.935	8,345	8,630	9,665	10,890	11,250	11,380
Sunderland	6,390	6,610	6,975	6,575	7,285	7,250	7,986	8,135	8,625	8.815	10,105	11,090	11,420	11,560

V.—China, Japan, etc. (*via* Suez).

	Saigon.	Hong Kong.	Shanghai.	Nagasaki.	Yokohama.	Vladivostock.*	Fiji Islands.	Manila.	Brisbane (via Torres Strait.)	Sydney (N.S.W.)	Auckland (N.Z.)	Wellington (N.Z.)	Honolulu.	San Francisco.
Cardiff .	8,805	9,718	10,470	10,595	11,065	11,250	11,540	9,470	11,788	11,520	12,400	12,420	13,150	13,490
Glasgow .	9,020	9,815	10,712	10,819	11,280	11,414	11,755	9,814	12,028	11,764	12,655	12,660	13,365	13,705
Liverpool .	8,910	9,856	10,665	10,700	11,170	11,355	11,645	9,575	11,924	11,600	12,545	12,560	13,955	13,795
London .	8,985	9,900	10,650	10,775	11,245	11,430	11,720	9,750	11,961	11,708	12,625	12,612	14,010	13,800
Sunderland	9,265	10,060	10,820	11,055	11,525	11,710	12,000	9,930	12,152	11,900	12,790	12.850	14,220	13,950

* *Via* Nagasaki.

VI.—America.

	Quebec.	Halifax, N.S.	New York.	Boston.	Jamaica.	New Orleans.	Panama.	Colon.	Pernambuco.	Bahia.	Rio de Janeiro.	Montevideo.	Buenos Ayres.	Valparaiso.
Cardiff .	2,750	2,505	3,065	2,782	4,030	4,510	4,527	4,487	3,950	4,375	5,020	5,990	6,100	8,690
Glasgow .	2,618	2,390	3 280	3,065	4,245	4.725	4,665	4,625	4,165	4,540	5,235	6,205	6.315	8.905
Liverpool .	2,655	2,455	3,052	2,805	4,135	4.615	4,570	5,530	4,055	4,430	5,125	6,095	6,205	8,795
London .	3,072	2,685	3,245	3,030	4,210	4,790	4,782	4,742	4,130	4,505	5,200	6,370	6,280	8,870
Sunderland	3,240	2,665	3,450	2,808	4,490	4,970	4,975	4,985	4,410	4,785	5,480	6,450	6,560	9,250

PROFILES OF
BRITISH AND FOREIGN WARSHIPS

1

CAPITAL SHIPS.

[In order to facilitate identification, the ships are arranged in accordance **with the number of funnels and masts,** as these are the features most easily distinguished at a distance. The page indicated, in the case of warships, refers the reader to the table where full particulars of the ships will be found. All the profiles are drawn to the scale ½ in. = 100 ft.]

[Indexes to the names of vessels of which profiles are included in this section are given at the end of the volume.]

FRANCE. Battleships. Condorcet, Diderot. (See p. 252.)

SWEDEN. Battleship. Oscar II. (See p. 271.)

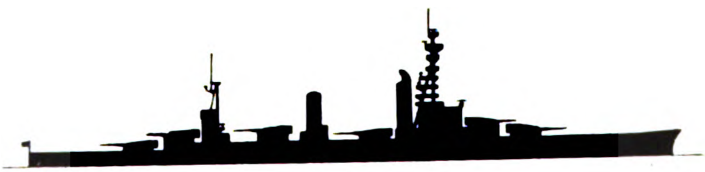
GREAT BRITAIN. Battle-cruiser. Hood. (See p. 238.)

GREAT BRITAIN. Battle-cruisers. Renown, Repulse. (See p. 239.)

P3

JAPAN. Battleships. Mutsu, Nagato. (See p. 263.)

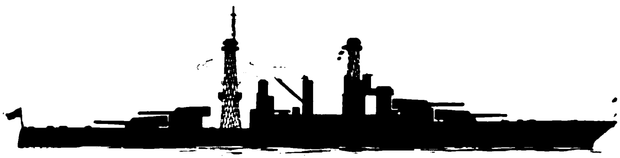
JAPAN. Battleships. Ise, Hyuga. (See p. 262.)



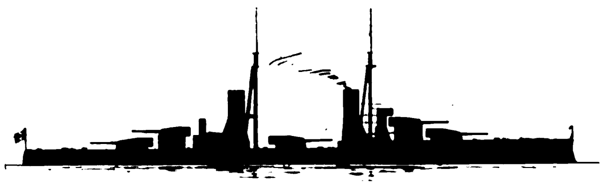
JAPAN. Battleships. Fuso, Yamashiro. (See pp. 262 and 263.)

JAPAN. Battle-cruisers. Hiyei. Haruna, Kirishima, Kongo. (See pp. 262 and 263.)

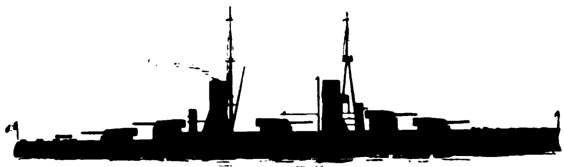
CHILE. Battleship. Almirante Latorre. (See p. 250.)
Modernised 1931—mainmast raised and bridge work altered.



UNITED STATES. Battleships California, Colorado, Maryland, Tennessee, West Virginia. (See pp. 272, 273, and 275.)

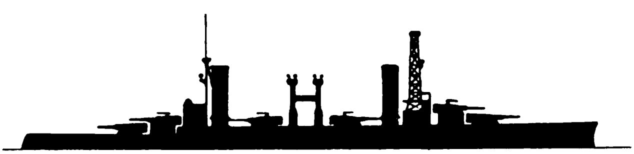


ITALY. Battleships. Andrea Doria, Caio Duilio. (See p 259.)



ITALY. Battleships. Conte Di Cavour, Giulio Cesare. (See p. 259.)

UNITED STATES. Battleships. Arkansas, Wyoming. (See pp. 272 and 313.)



ARGENTINE. Battleships. Moreno, Rivadavia. (See p. 248.)

FRANCE. Battleships. Bretagne, Lorraine, Provence. (See pp. 252 and 253.)

FRANCE. Battleships. Courbet, Jean Bart, Paris. (See pp. 252 and 253.)

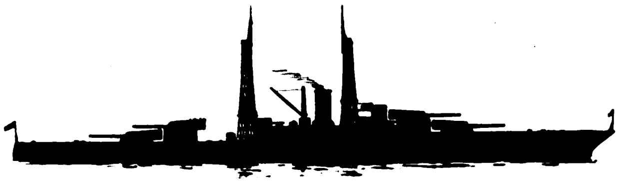
BRAZIL. Battleships. Minas Geraes, São Paulo. (See p. 249.)

GREAT BRITAIN. Battleships. N lson, Rodney. (See pp. 238 and 239.)

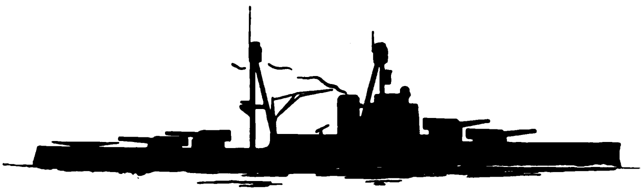
GREAT BRITAIN. Battleships. Queen Elizabeth, Warspite, Barham, Valiant, Malaya. (See pp. 238 and 240.)

UNITED STATES. Battleships. New York, Texas. (See pp. 274 and 275.)

GREAT BRITAIN. Battleships. Ramillies, Resolution, Revenge, Royal Oak, Royal Sovereign. (See p. 239)

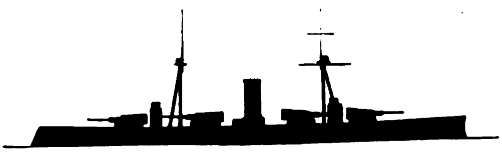


UNITED STATES. Battleships. Idaho, Mississippi, New Mexico. (See pp. 273 and 274)



UNITED STATES. Battleships. Arizona, Pennsylvania. (See pp. 272 and 274.)

UNITED STATES. Battleships. Nevada, Oklahoma. (See p. 274.)



SPAIN. Battleships. Espana, Jaime I. (See p. 269)

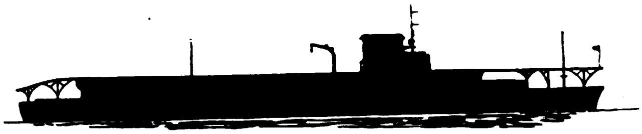
GERMANY. Battleship. Deutschland. (See p. 256.)

AIRCRAFT CARRIERS.

GREAT BRITAIN. Aircraft Carrier. Eagle. (See p. 243.)

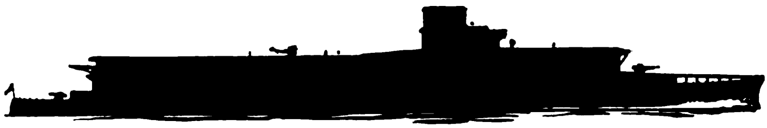
SWEDEN. Aircraft Cruiser. Gotland. (See p. 271.)

GREAT BRITAIN. Aircraft Carrier. Hermes. (See p. 244.)

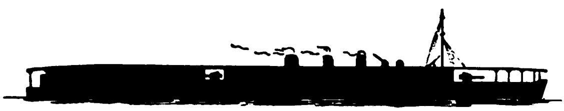


FRANCE. Aircraft Carrier. Béarn. (See p. 254.)

UNITED STATES. Aircraft Carriers. Saratoga, Lexington. (See pp. 273 and 275.)



GREAT BRITAIN. Aircraft Carriers. Courageous, Glorious. (See p. 241.)



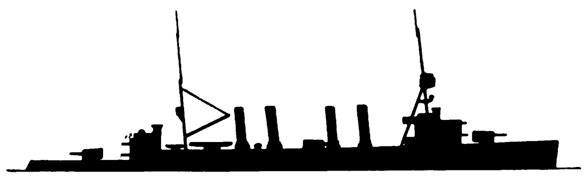
JAPAN. Aircraft Carrier. Hosho. (See p. 264.)

GREAT BRITAIN. Aircraft Carrier. Furious. (See p. 244.)

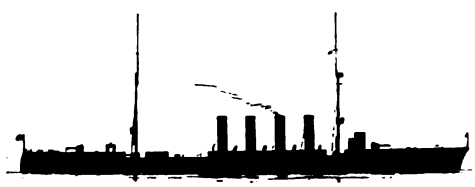
JAPAN. Aircraft Carrier. Akagi. (See p. 264.)

CRUISERS.

JAPAN. Cruisers. Naka, Sendai, Jintsu. (See p. 265)

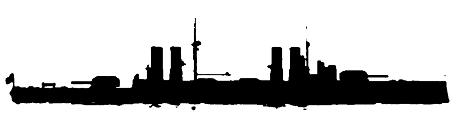


UNITED STATES. Light Cruisers. Cincinnati, Concord, Detroit, Marblehead, Memphis, Milwaukee, Omaha, Raleigh, Richmond, Trenton. (See pp. 276 and 277.)

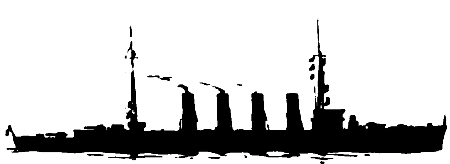


JAPAN. Cruisers Hirado, Yahagi. (See p. 264)

ROYAL AUSTRALIAN NAVY. Cruiser. Adelaide. (See p. 246.)

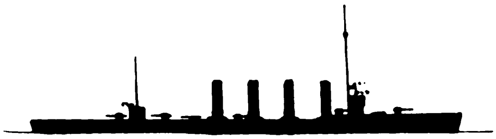


ITALY. Armoured Cruisers. San Ciorgio, San Marco. (See p. 25[illegible].)

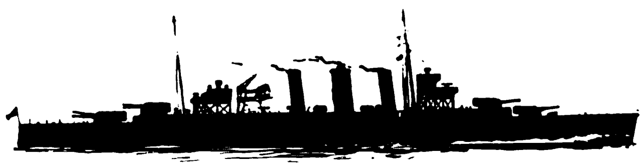


FRANCE. Light Cruiser. Mulhouse (*ex-German* **Stralsund**). (See p. 255.)

ITALY. Light Cruiser. Taranto (*ex-German* **Strassburg**). (See p. 261.)



FRANCE. Light Cruiser. Thionville (*ex-Austrian* **Novara**) (See p. 255.)
Italian cruisers **Brindisi** (p. 261) (*ex-Austrian* **Helgoland**) and **Venezia** (*ex-Austrian* **Saida**) are practically similar.



GREAT BRITAIN. Cruisers. Devonshire, Dorsetshire, London, Norfolk, Shropshire, Sussex. (See pp. 243, 244, and 245.)

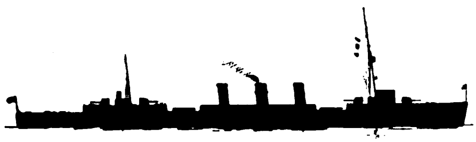
GREAT BRITAIN. Cruisers. Berwick, Cornwall, Cumberland, Kent, Suffolk. (See pp. 241, 244, and 245.)
COMMONWEALTH OF AUSTRALIA. Cruisers. Australia, Canberra. (See p. 246.)

GREAT BRITAIN. Cruisers. Emerald, Enterprise (See p 244)

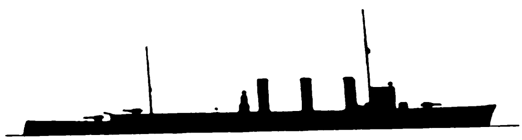
JAPAN. Light Cruisers. Kiso, Kitakami, Kuma, O-I, Tama, Isudzu, *Natori, *Nagara, *Yura, *Kinu, *Abukuma. (See pp. 264 and 265.)

* **Has aircraft hangar incorporated in bridge structure.**

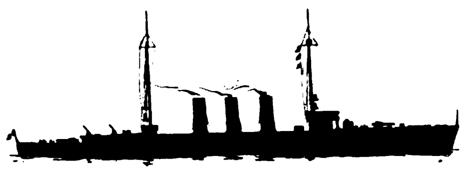
FRANCE. Light Cruiser. Metz (*ex-German* **Königsberg**). (See p. 254.)



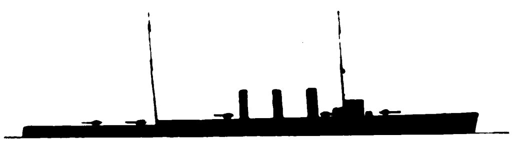
JAPAN. Light Cruisers. Tatsuta, Tenryu. (See p. 265.)



SPAIN. Light Cruisers. Blas de Lezo, Mendez Nunez. (See p. 270.)

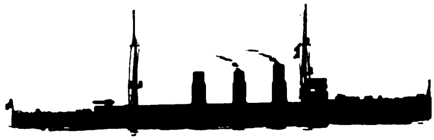


FRANCE. Light Cruiser. Strasbourg (*ex-German* **Regensburg**). (See p. 255.)



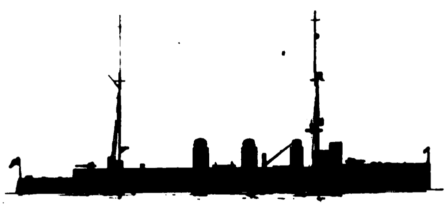
SPAIN. Light Cruiser. Republica. (See p. 270.)

ITALY. Light Cruiser. Ancona (*ex-German* **Graudenz**). (See p. 261.)



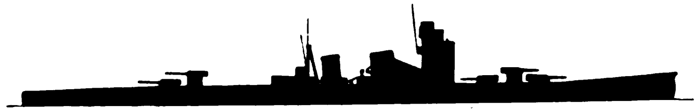
ITALY. Light Cruiser. Bari (*ex-German* Pillau). (See p. 261.)

GREAT BRITAIN. Light Cruiser. Comus. (See p. 241.)

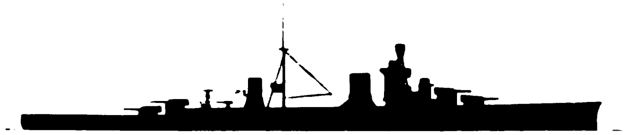


ITALY. Scout Cruiser. Quarto. (See p. 261.)

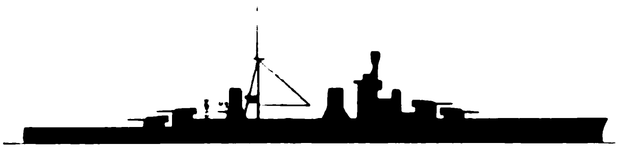
JAPAN. Second Class Cruiser. Tone. (On disposal list, 1931.)



JAPAN. Cruisers. Nachi, Myoko, Ashigara, Haguro, Atago, Takao, Chokai, Maya. (See p. 264.)



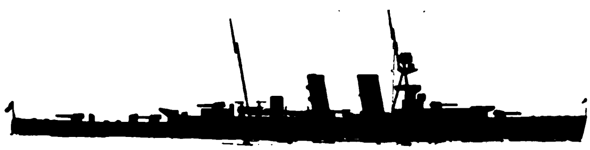
ITALY. Cruiser. Bolzano. (See p. 260.)



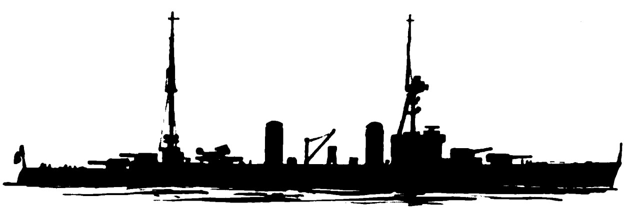
ITALY. Cruisers. Pola, Zara, Fiume, Gorizia. (See p. 260.)

JAPAN. Cruisers. Furutaka, Kako. (See p. 264.)

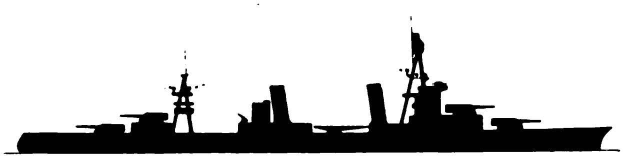
JAPAN. Cruisers. Aoba, Kinugasa. (See p. 264.)



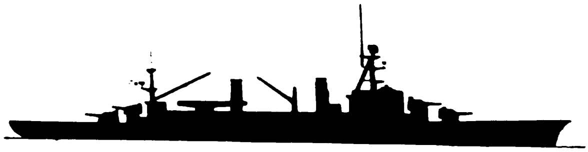
GREAT BRITAIN. Cruisers. Effingham, Frobisher, Hawkins, Vindictive. (See pp. 244 and 245.)



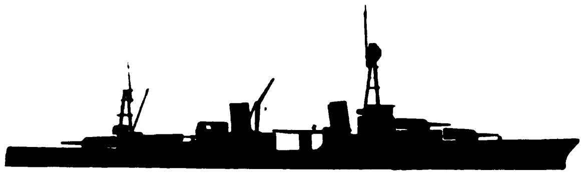
FRANCE. Cruisers. Duquesne, Tourville, Suffren, Colbert, Foch. (See p. 254.)



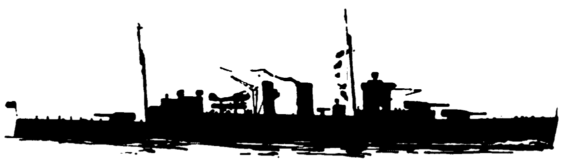
UNITED STATES. Cruisers. Salt Lake City. Pensacola. (See p. 277.)



FRANCE. Training Cruiser. Jeanne d'Arc. (See p. 254.)

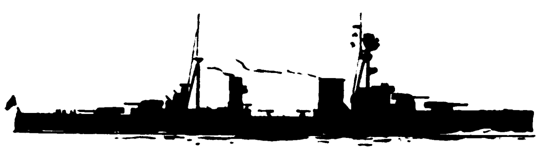


UNITED STATES. Cruisers. Northampton, Chester, Louisville, Chicago, Houston, Augusta. (See p. 276.)



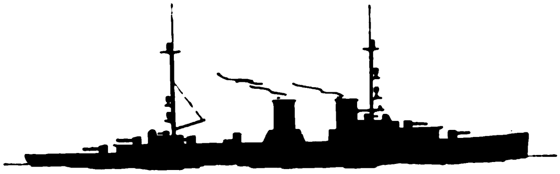
GREAT BRITAIN. Cruiser. York. (See p. 245.)
Exeter (p. 244) is similar, but funnels and masts are vertical.

GERMANY. Light Cruisers. Köln, Karlsruhe, Konigsberg. (See p. 257.)



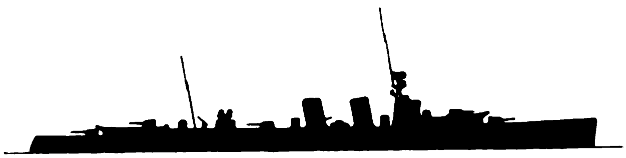
ITALY. Cruisers. Alberico de Barbiano, Alberto di Giussano Bartolomeo Colleoni, Giovanni della Bande Nere. (See p. 26[illegible].)

GREAT BRITAIN. Cruiser Minelayer. Adventure. (See p. 241.)

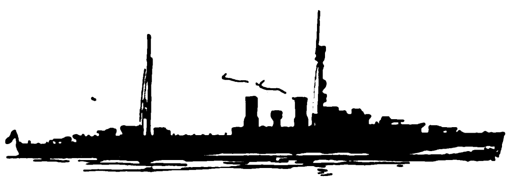


NETHERLANDS. Cruisers. Java, Sumatra. (See p. 266.)

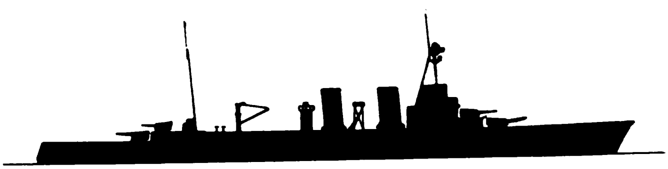
ITALY Cruisers. Trento, Trieste. (See p. 261)



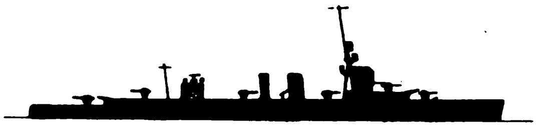
SPAIN. Light Cruisers. Libertad, Almirante Cervera, Miguel de Cervantes. (See p. 270.)



GERMANY. Light Cruiser. Emden. (See p. 257.)



FRANCE. Cruisers. La Motte Piquet, Duguay-Trouin, Primauguet. (See pp. 254 and 255.)

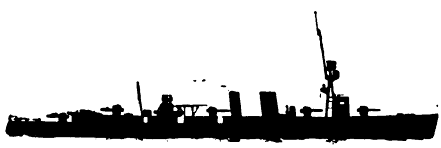


GREAT BRITAIN. Light Cruisers. Danae, Dauntless, Dragon. (See p. 243.)

GREAT BRITAIN. Light Cruisers. Delhi, Dunedin, Diomede, Despatch, Durban. (See pp. 243 and 247.)

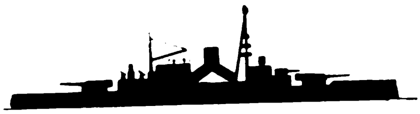
GREAT BRITAIN. Light Cruisers. Cardiff, Ceres, Coventry, Curacoa, Curlew. (See p. 243.)

GREAT BRITAIN. Light Cruisers. Cairo, Calcutta, Capetown, Carlisle, Colombo. (See p. 242.)

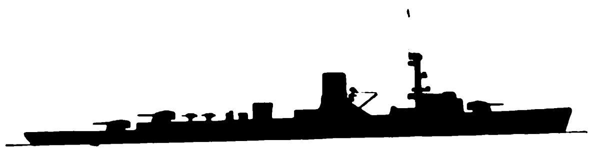


GREAT BRITAIN. Light Cruisers. Caledon, Calypso, Caradoc, Centaur, Concord. (See pp. 242 and 243.)

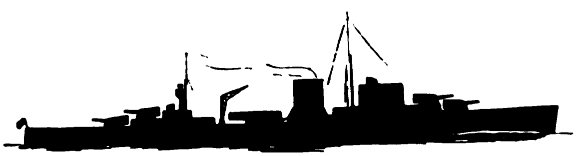
GREAT BRITAIN. Light Cruisers. Cambrian, Canterbury, Castor, Constance, Champion. (See p. 242.)



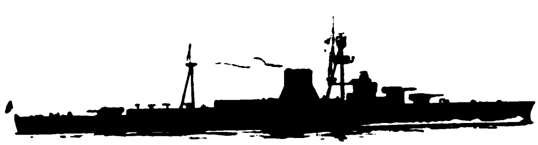
SWEDEN. Armoured Cruiser. Gustav V, Sverige. (See p. 271.)



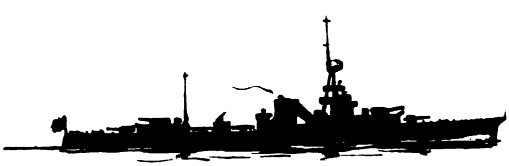
GERMANY. Light Cruiser. Leipzig. (See p. 257.)



GREAT BRITAIN. Cruiser. Leander. (See p. 241).



ARGENTINE. Cruisers. Almirante Brown, Vintecinco de Maio. (See p 248.)

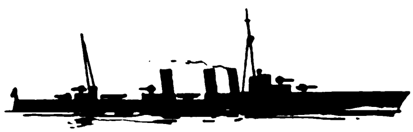


JAPAN. Light Cruiser. Yubari. (See p. 265.)

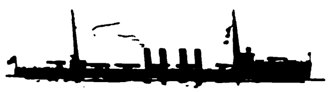
FLOTILLA LEADERS AND DESTROYERS.

(See pp. 283–307.)

FRANCE. Flotilla Leaders. Bison, Quépard, Lion, Vauban, Valmy, Verdun, D 4–9, DA 10–15.



FRANCE. Flotilla Leaders. Jaguar, Panthére, Leopard, Lynx, Chacal, Tigre.



UNITED STATES. Torpedo Boat Destroyers. Aylwin, Balch, Benham, Duncan, Parker.

UNITED STATES. Torpedo Boat Destroyer. Clemson.

FRANCE. Torpedo Boat Destroyers. Aventurier, Intrépide, Téméraire, Opiniâtre.

FRANCE. Torpedo Boat Destroyers. Enseigne Roux, Mécanicien Principal Lestin.

FRANCE. Torpedo Boat Destroyer. Bouclier.

JAPAN. Torpedo Boat Destroyers. Amatsukaze, Tokisukaze, Isokaze, Hamakaze.

FRANCE. Torpedo Boat Destroyers. Bourrasque, Orage, Ouragan, Simoun and class.

UNITED STATES. Torpedo Boat Destroyer. Caldwell.

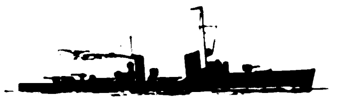
FRANCE. Torpedo Boat Destroyers. Algérien, Annamite, Arabe, Bambara, Hova, Kabyle, Marocain, Sakalave, Sénégalais, Somali, Tonkinois, Touareg.

ITALY. Torpedo Boat Destroyers. Angelo Bassini, E. Cosenz, Francesco Stocco, Giacinto Carini, Giacomo Medici, Giovanni Acerbi, Giuseppe la Farina, Giuseppe la Masa, Giuseppe Sirtori, Nicola Fabrizi, Vincenzo Orsini

JAPAN. Destroyers. Fubuki and class.

ITALY. Flotilla Leaders, Nicoloso Da Recco and class.

ITALY. Flotilla Leaders. Leone, Pantera, Tigere.



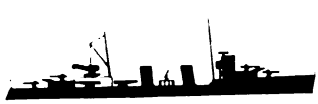
GERMANY. Destroyers. Iltis, Wolf, Tiger, Luchs, Jaguar, Leopard.

GREAT BRITAIN. Flotilla Leader. Codrington

GREAT BRITAIN. Destroyers. "Acasta" and "Beagle" classes.

ITALY. Torpedo Boat Destroyer. Carlo Mirabello.

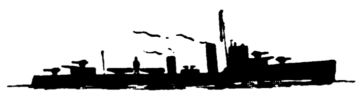
GREAT BRITAIN. Flotilla Leaders. Broke, Keppel, Shakespeare, Spenser, Wallace.



HOLLAND. Destroyers. De Ruyter, Evertsen, Piet Hein, Kortenaer.

GREAT BRITAIN. Destroyers. Vansittart, Venomous, Verity, Volunteer, Wanderer, Veteran.

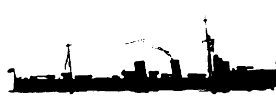
GREAT BRITAIN. Destroyers. Vanessa, Vanity, Vanoc, Vanquisher, Vectis, Vega, Velox, Vendetta, Venetia, Venturous, Verdun, Versatile, Vesper, Vidette, Vimiera, Violent, Vivacious, Vivien, Vimy (*late* Vancouver), Vortigern, Valhalla, Valentine, Valkyrie, Valorous, Vampire, Viceroy, Viscount, Voyager, Wakeful, Walker, Walpole, Walrus, Warwick, Watchman, Waterhen, Wessex, Westcott, Westminster, Whirlwind, Whitley, Winchelsea, Winchester, Wolfhound, Wolsey, Woolston, Wrestler, Wryneck.



GREAT BRITAIN. Destroyers. Whitehall, Whitshed, Wildswan, Witherington, Wivern, Wolverine, Worcester, Wishart, Witch.

GREAT BRITAIN. Destroyers. Ambuscade, Amazon.

CHILE. Destroyers. Serrano, Orella, Riquelme, Hyatt, Vidella, Aldea.



JAPAN. Torpedo Boat Destroyers. Momo and class (8).

ITALY. Torpedo Boat Destroyer. Quintino Sella.

ITALY. Torpedo Boat Destroyer. Alessandro Poerio.

ITALY. Torpedo Boat Destroyer. Nazario Sauro.

GREAT BRITAIN. Destroyers. Admiralty "S" class.

ITALY. Torpedo Boat Destroyer. Palestro.

ITALY. Torpedo Boat Destroyer. Turbine.

ITALY. Destroyers. Dardo, Freccia, Strale, Saetta, Folgore, Lampo, Baleno, Fulmine.

PLANS

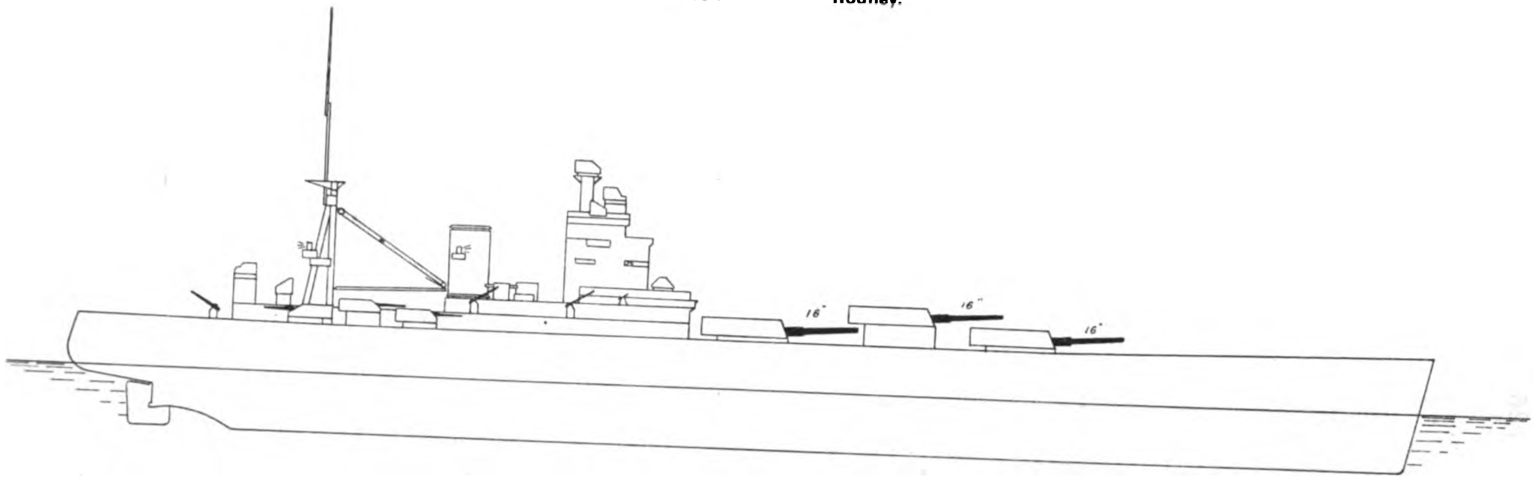
OF

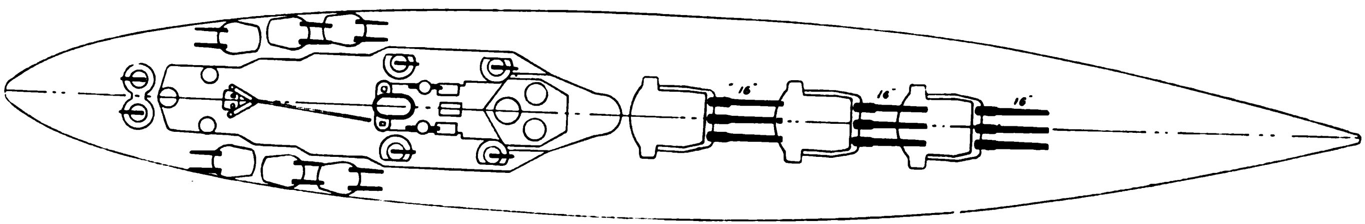
BRITISH AND FOREIGN WARSHIPS.

GREAT BRITAIN.

BATTLESHIPS.

Nelson. Rodney.



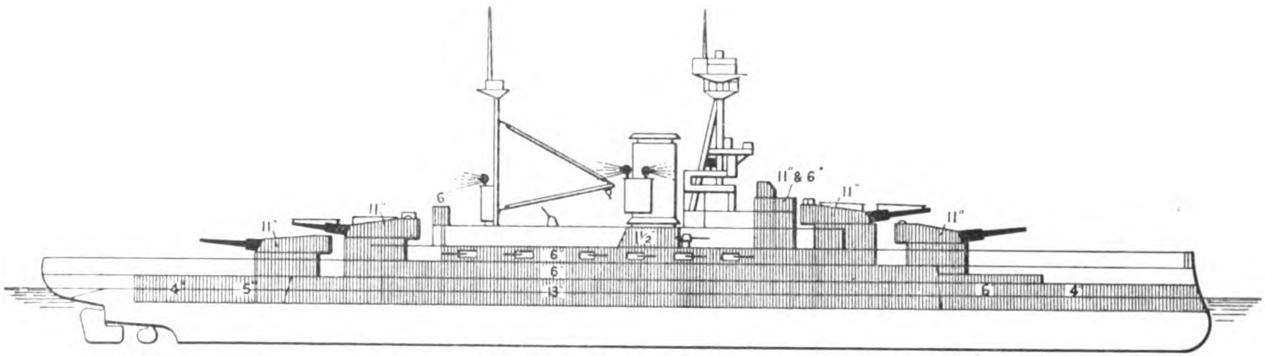


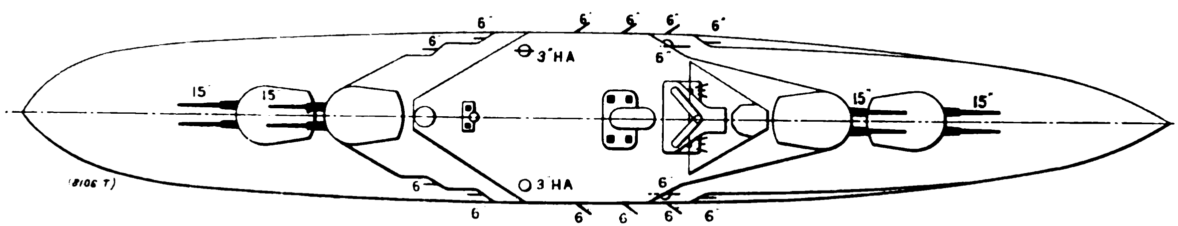
Length (extreme), 710 ft.; Rodney, 33,500 tons; Nelson, 33,900 tons; Speed, 23 knots.
Armament, 9—16-in.; 12—6-in.; 6—4·7-in. A.A.; 4—3-pr.; 8—2-pr. Pom Poms; 10 L.; 5 M; 2 torpedo tubes.

GREAT BRITAIN.

BATTLESHIPS.

Royal Sovereign. **Royal Oak.** **Revenge.** **Resolution.** **Ramillies.**





Length (extreme), 620 ft. 6 ins.* ; Length B.P., 580 ft. ; 29,150 tons ; Speed, 23 knots ; Completed, 1916-17. Armament, 8—15 in. ; 14—6 in. ; 2—4-in. A.A. ; 4—3-pr. ; 5 M ; 10 L. ; 4 torpedo tubes (Resolution, 2).

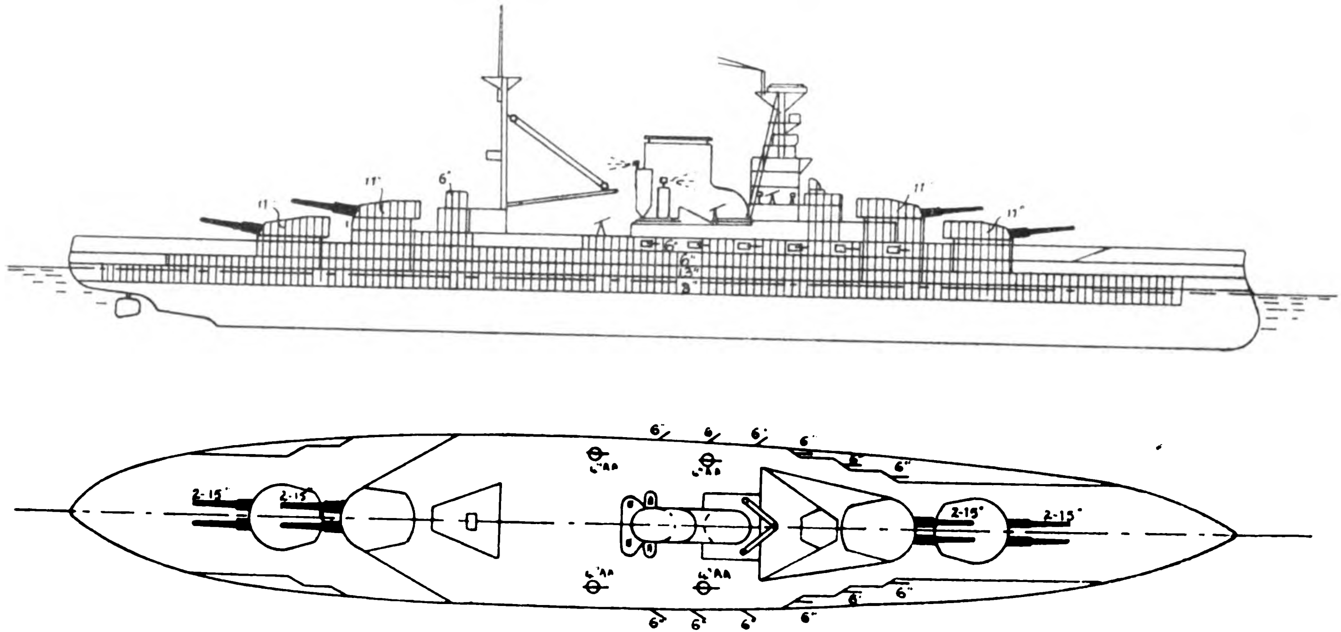
Searchlights on mainmast removed.

*** Revenge, 625 ft. 9 in.**

GREAT BRITAIN.

BATTLESHIPS.

Queen Elizabeth. Warspite. Barham. Valiant. Malaya
(As reconstructed 1926–31.)

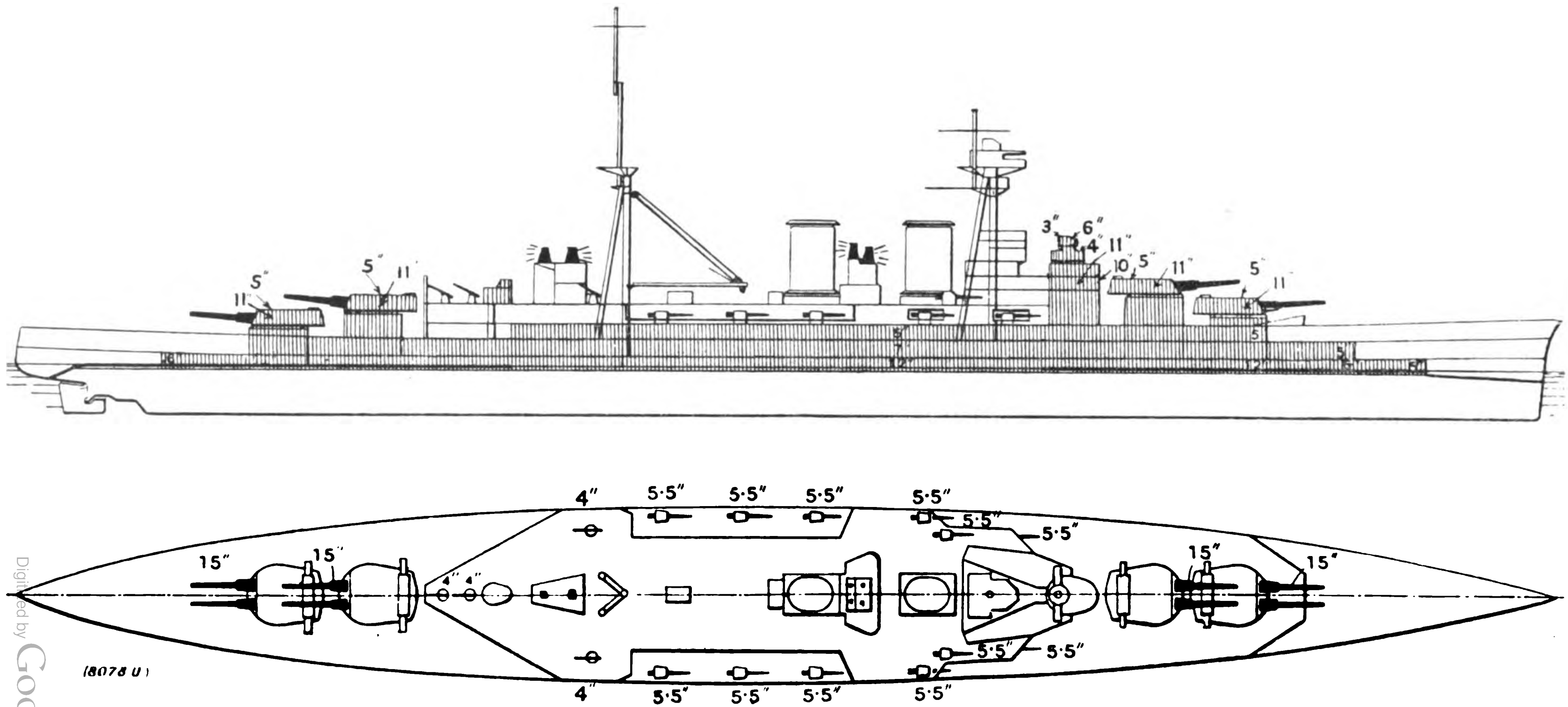


Length B.P., 600 ft.; 31,100 tons; Speed, 25 knots; Completed, 1915-1916.
Armament, 8—15-in.; 12—6-in.; 4—4-in. A.A.; 4—3-pr.; 5 M.; 10 L.; 4 torpedo tubes (Queen Elizabeth and Valiant, 2).

GREAT BRITAIN.

BATTLE-CRUISER.

Hood.



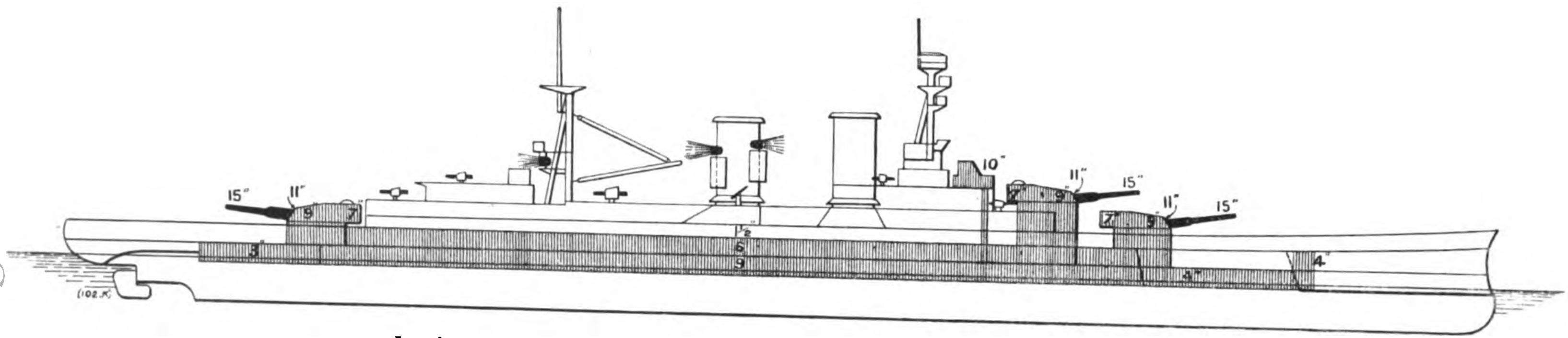
Length (extreme), 860 ft. 10 ins.; Length B.P., 810 ft.; 42,100 tons; Speed, 31* knots; Completed, 1920.
Armament, 8—15-in.; 12—5·5-in.; 4—4-in A.A.; 4—3-pdr.; 5 M.; 10 L.

* Trials at 44,600 tons, 31·89 knots with 151,000 S.H.P.

GREAT BRITAIN

BATTLE-CRUISERS.

Repulse. Renown.

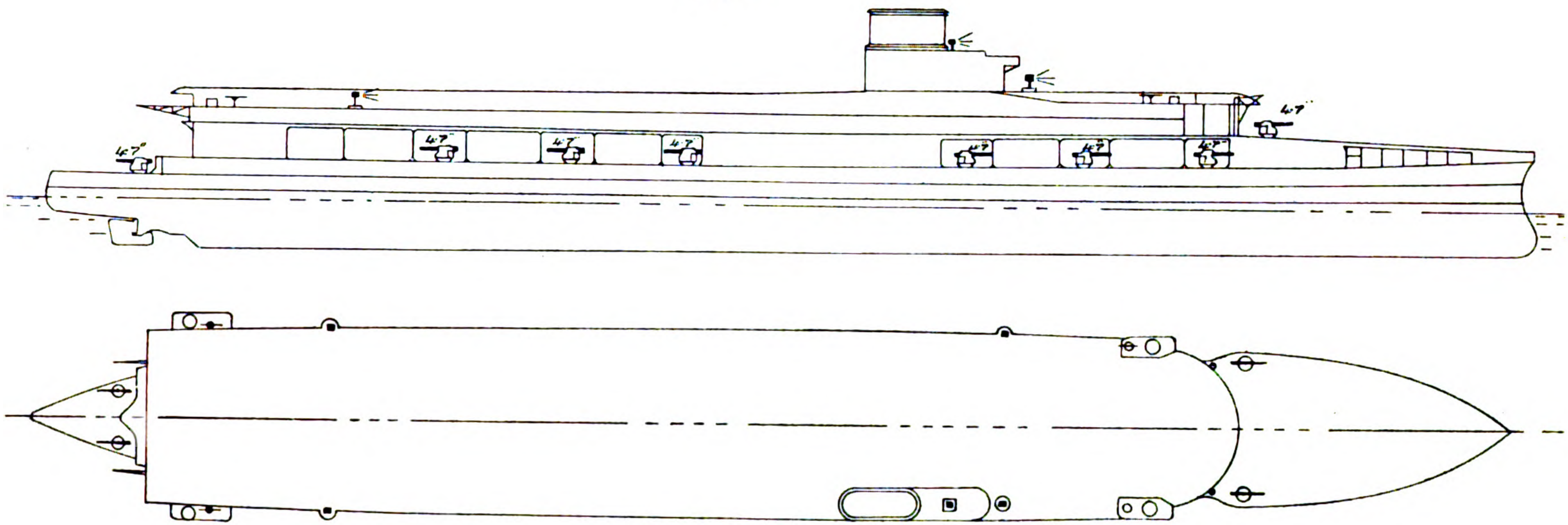


Length (extreme), 794 ft. 2 ins.; Length B.P., 750 ft.; 32,000 tons; Speed, 31·5 knots; Completed, 1916.
Armament, 6—15-in.; 15—4-in.; 4—3-pr.; 4—4-in. A.A.; 5 M.; 10 L.; 2 submerged torpedo tubes (Repulse, 8 a.w. in addition).
NOTE.—Repulse originally had a 6-in. main belt, but was re-armoured in 1920-21. Re-armouring of the Renown was completed during 1926.

GREAT BRITAIN.

AIRCRAFT CARRIERS.

Courageous. Glorious.

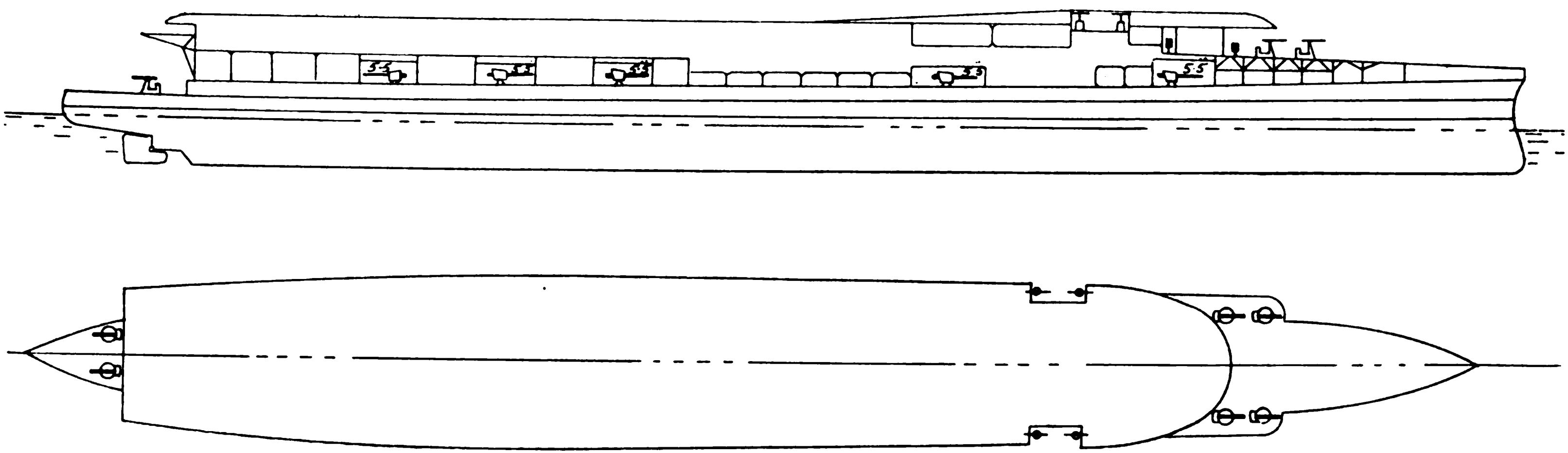


Length (extreme), 786 ft. 6 ins.; 22,500 tons; Speed, 31 knots.
Armament, 16—4·7-in.; 4—3-pr.; 4—2-pr.; 4 M.; 42 L.

GREAT BRITAIN

AIRCRAFT CARRIER.

Furious.

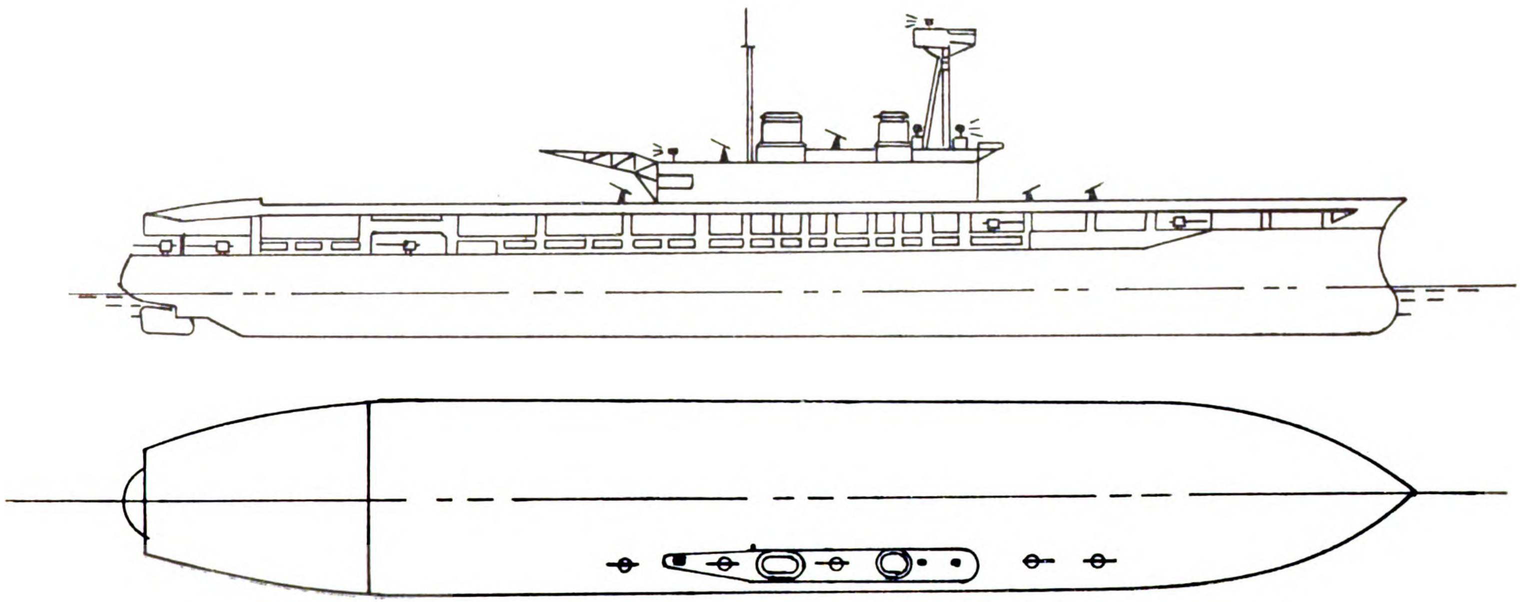


Length (extreme), 786 ft. 6 ins.; 22,450 tons; Speed, 31 knots; Completed, 1917.
Armament, 10—5·5-in.; 6—4-in. A.A.; 4—3-pr.; 4—2-pr.; 4 M.; 10 L.

GREAT BRITAIN.

AIRCRAFT CARRIER.

Eagle.

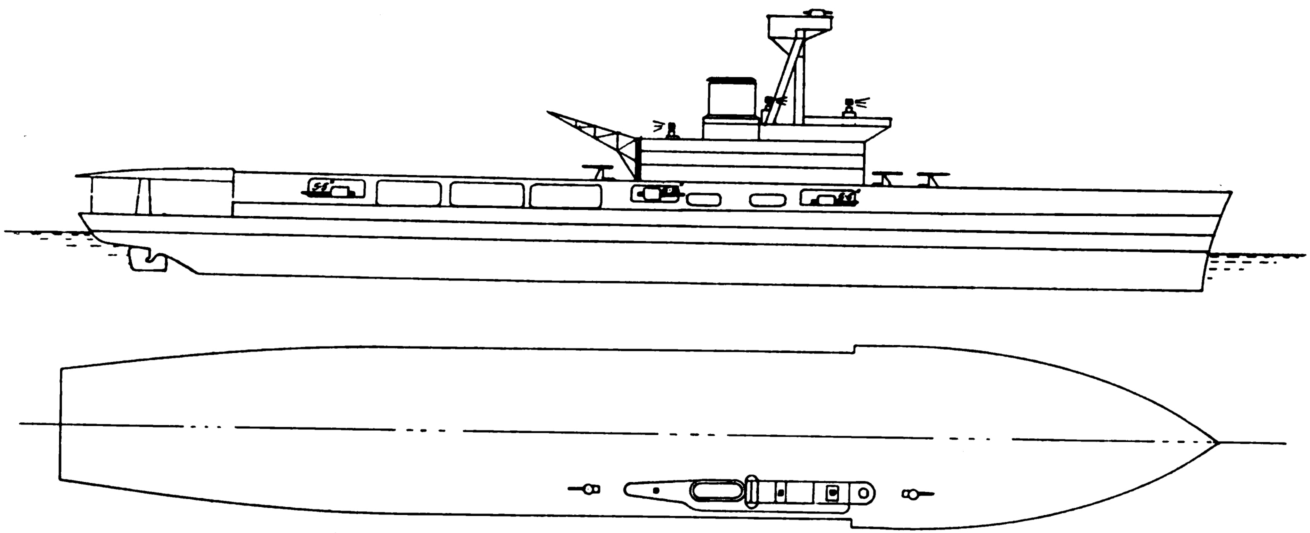


Length (extreme), 667 ft. 6 ins.; 22,600 tons; Speed, 24 knots.
Armament, 9—6-in.; 5—4-in. A.A.; 4—3-pr.; 4 M.; 26 L.

GREAT BRITAIN.

AIRCRAFT CARRIER.

Hermes.

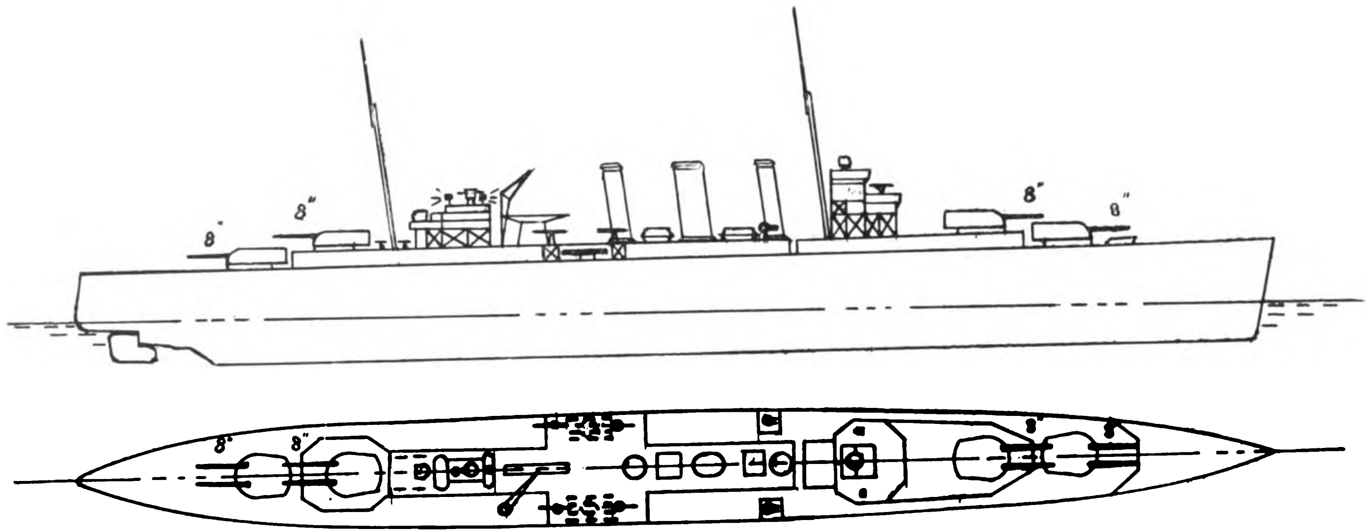


Length (extreme), 599 ft. 6 ins.; 10,850 tons; Speed, 25 knots; Completed 1924.
Armament, 6—5·5-in.; 3—4-in. A.A.; 4—3-pr.; 2—2-pr.; 4 M.; 10 L.

GREAT BRITAIN.

CRUISERS.

London. Sussex. Shropshire. Devonshire. Dorsetshire.* Norfolk.*



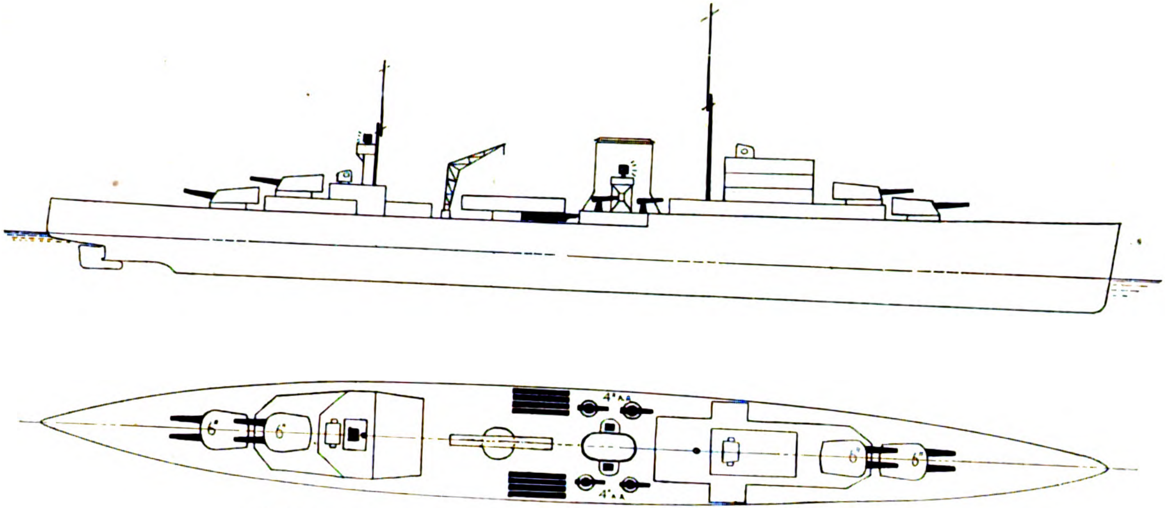
Displacement, 10,000 tons; Length (extreme), 630 ft. Armament, 8—8-in.; 4—4-in. A.A.; 4—3-pr.; 4—2-pr.; 4 M.; 8 L.; 8 torpedo tubes.

* In Dorsetshire and Norfolk the seaplane crane and the 4—4-in. guns are slightly forward of the positions shown.

GREAT BRITAIN

CRUISER.

Leander.

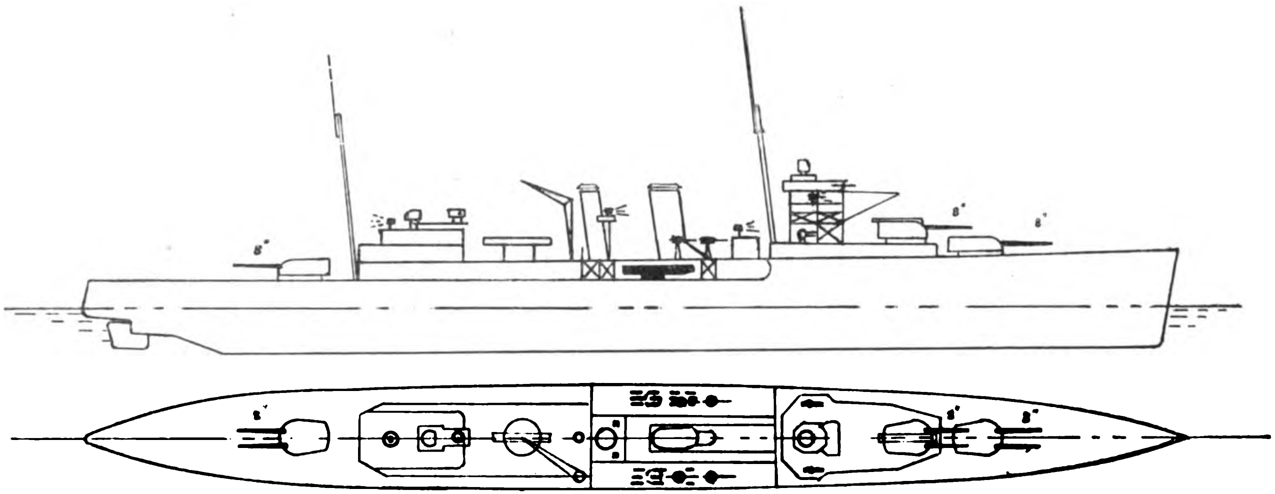


Displacement, 7,000 tons; Length, 547 ft. (on W.L.). **Armament 8—6-in., 4—4-in.**

GREAT BRITAIN

CRUISERS.

York. Exeter.*



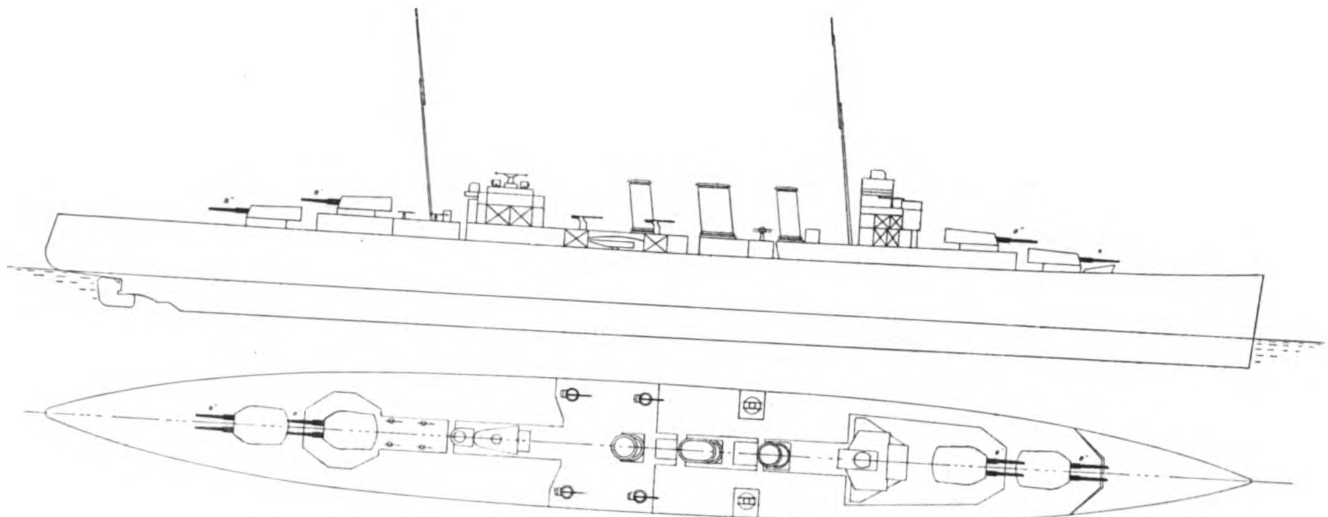
Displacement, 8,400 tons: Length (extreme), 575 ft. Armament, 6—8-in.; 4—4-in. A.A.; 4—3-pr; 2—2-pr.; 4 M; 8 L.; 6 torpedo tubes.

* In Exeter funnels and masts are vertical, and the mainmast is taken up through the superstructure.

GREAT BRITAIN.

CRUISERS.

Kent. Berwick. Cumberland. Suffolk. Cornwall. Australia.* Canberra.*



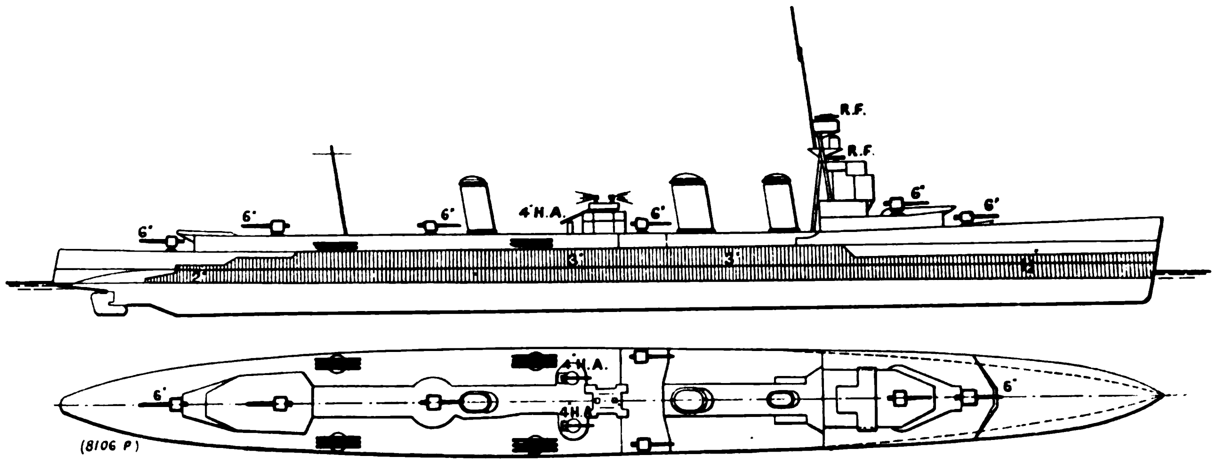
Length (extreme), 630 ft.; B.P., 590 ft.; 10,000 tons; Speed, 31½ knots.
Armament, 8—8-in.; 4—4-in. A.A.; 4—3-pr.; 4—2-pr. Pom Poms; 4 M.; 8 L.; 2 Q R. torpedo tubes.

* H.M. Australian Navy.

GREAT BRITAIN.

LIGHT CRUISERS.

Emerald. **Enterprise.***



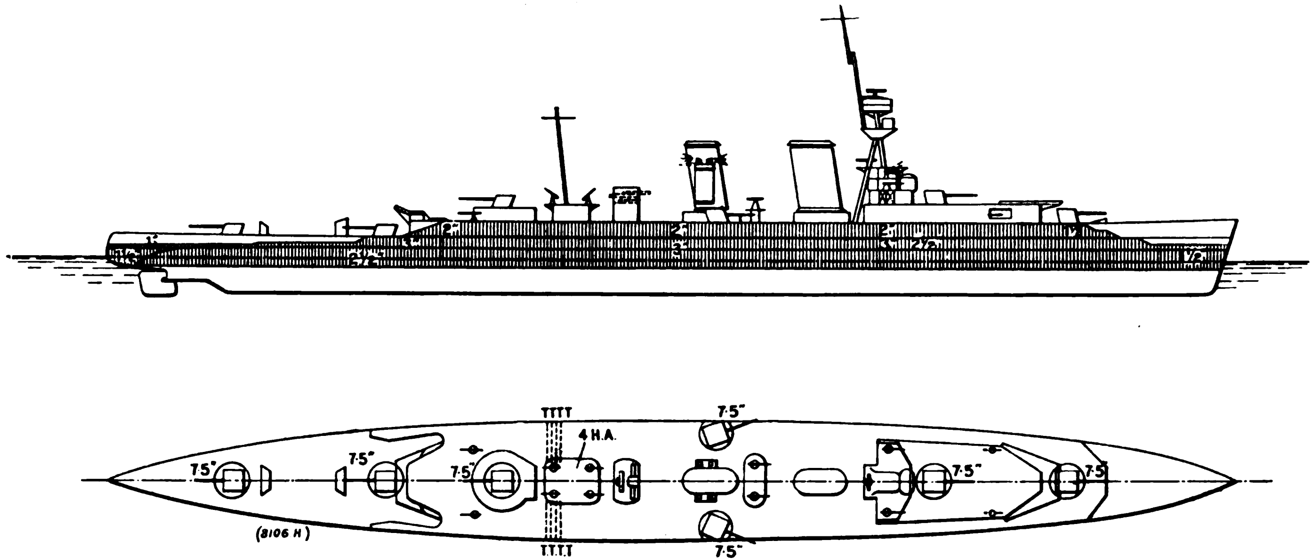
Length (extreme), 570 ft.; Length B.P., 535 ft.; Emerald, 7,550 tons; Enterprise, 7,580 tons; Speed, 33 knots.
Armament, 7—6-in.; 3—4-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 2 M.; 8 L.; 16 torpedo tubes.

* In Enterprise the two forward 6-in. guns are mounted in a twin-mounting on forecastle deck.

GREAT BRITAIN.

LIGHT CRUISERS.

Effingham. Hawkins. Frobisher. Vindictive.*



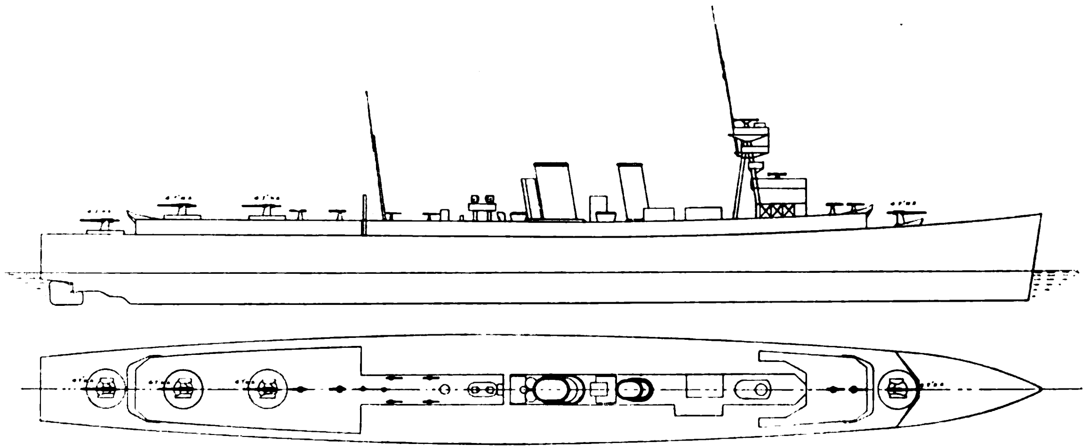
Length (extreme), 605 ft.; Length B.P., 565 ft.; 9,860 tons; Speed, 30 knots.
Armament, 7—7·5-in.; 3—4-in. A.A.; 4—3-pr.; 2—2-pr.; 2 M.; 8 L.
Hawkins has 4—4-in. A.A.

*** Vindictive has a catapult mounted forward of the bridge, and to accommodate this the raised 7·5-in. gun forward has been removed.**

GREAT BRITAIN.

CRUISER MINELAYER.

Adventure.

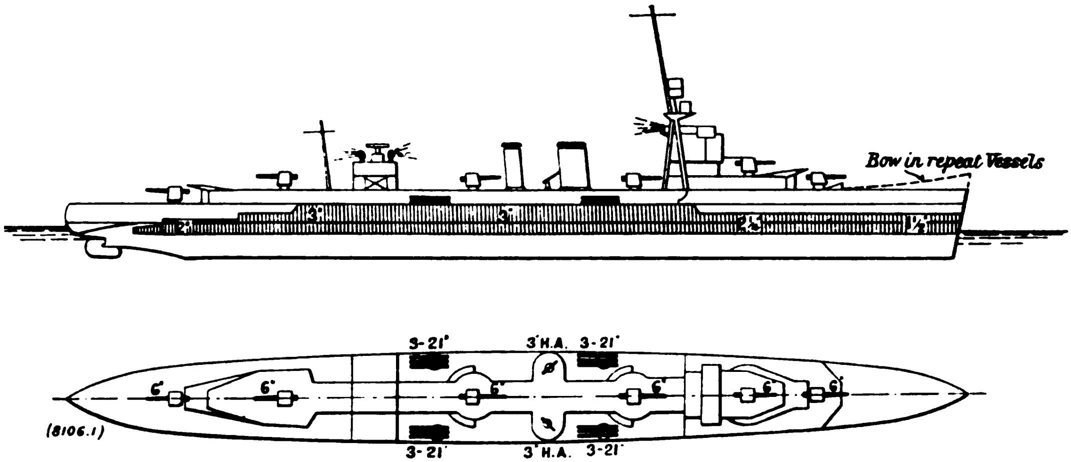


Length (extreme), 521 ft.; Length, B.P., 500 ft.; 6,740 tons; Speed, 27¾ knots.
Armament, 4–4·7-in. A.A.; 4–3-pr.; 4—2-pr.; 2 M.; 8 L.; 310 mines.

GREAT BRITAIN.

LIGHT CRUISERS. D CLASS.

*Despatch. *Diomede. Danae. *Dunedin. Dauntless. *Durban. Dragon. *Delhi.



Length, 472¾ ft. ; 4,850 tons ; Speed, 29 knots ;
Armament, 6—6-in. ; 3—4-in. A.A. ; 4—3-pr., 2—2-pr. ; 2 M ; 8 L.

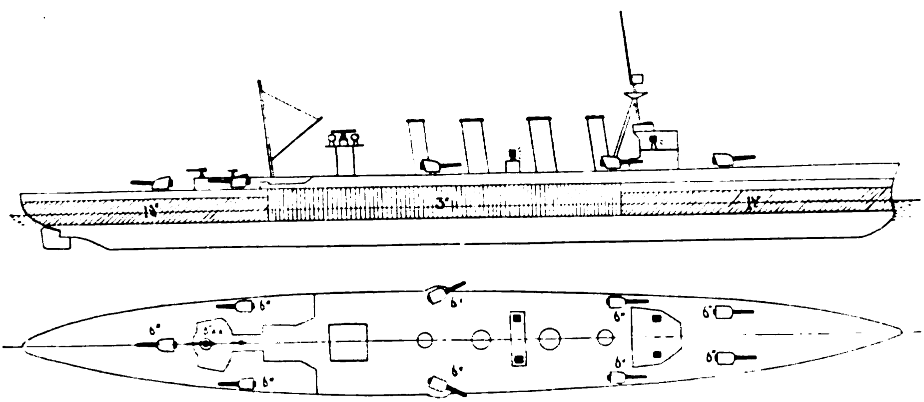
Diomede and Dunedin are now attached to the New Zealand Division.

* Repeat vessels.

ROYAL AUSTRALIAN NAVY.

CRUISER.

Adelaide.

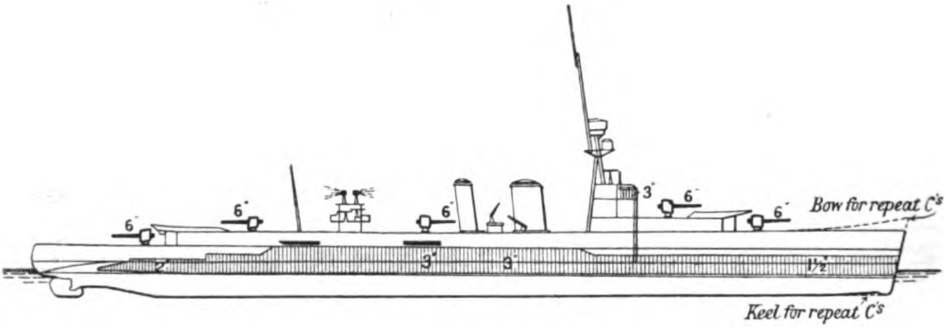


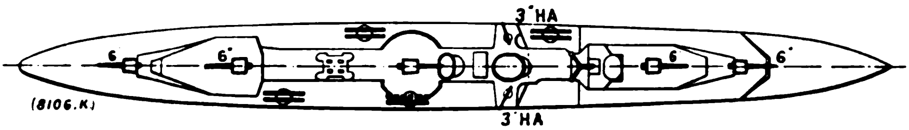
Length, 462¼ ft. ; 5,100 tons ; 25 knots.
Armament, 9—6-in. ; 4—3 pr. ; 1—3-in. A.A.

GREAT BRITAIN.

LIGHT CRUISERS.

Ceres. **Curacoa.** **Curlew.** **Cardiff.** **Coventry.**
***Cairo.** ***Cape Town.** ***Carlisle.** ***Colombo.** ***Calcutta.**



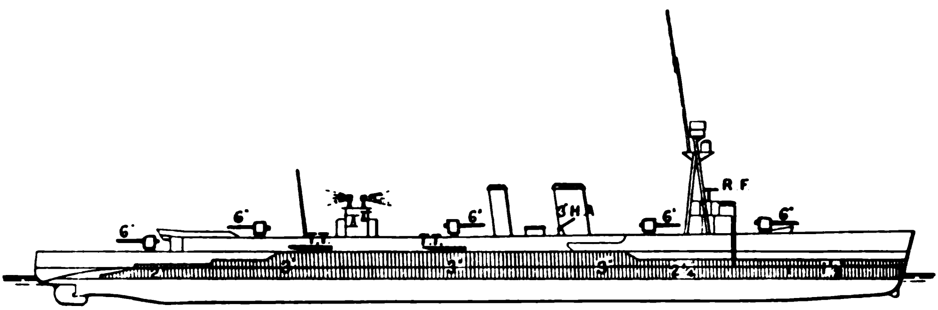


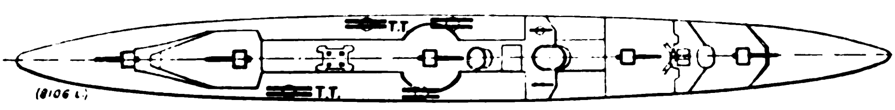
Length (extreme), 450 ft. (451 ft. 6 ins. Repeat Vessels); Length B.P., 425 ft.; 4,290 tons; Repeat vessels, 4,200 tons; Speed, 29 knots; Completed, 1917-18 (Repeat Vessels, 1918-22).
Armament, 5—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 4 above-water D.R. torpedo tubes.
Cardiff and Ceres have 2—3-pr.

* Repeat vessels.

LIGHT CRUISERS.

Caledon. **Calypso.** **Caradoc.**
Centaur. **Concord.**





These Plans apply to the above-named ships, but there are differences in detail, as stated below.

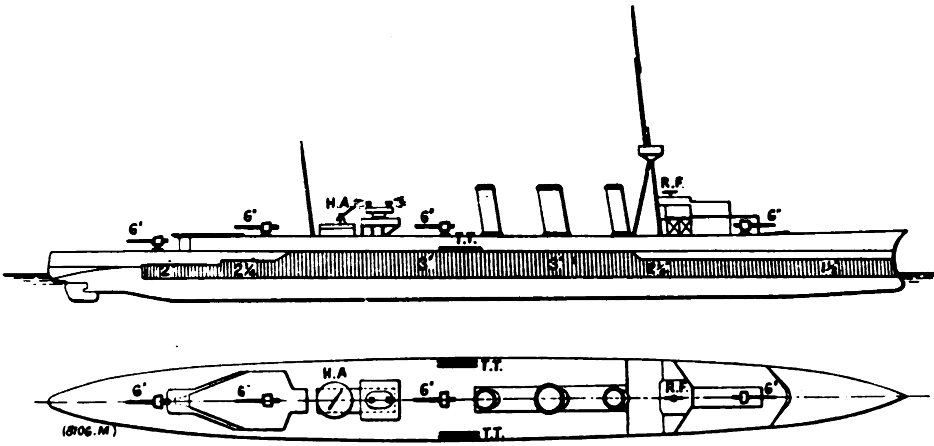
Caledon, Calypso, Caradoc — Length (extreme), 450 ft.; Length B.P., 425 ft.; 4,180 tons; Speed, 29 knots; Completed, 1917. Armament, 5—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 2 M.; 8 L.; and 4 above-water D.R. torpedo tubes.

Centaur, Concord — Length (extreme), 446 ft.; Length B.P., 420 ft.; 4,120 tons; Speed, 29 knots; Completed, 1916. Armament, 4—6-in.; 2—3-in. A.A.; 2—3-pr.; 2—2-pr. Pom Poms; 2 M.; 8 L.; and 2 submerged torpedo tubes.

GREAT BRITAIN.

LIGHT CRUISER.

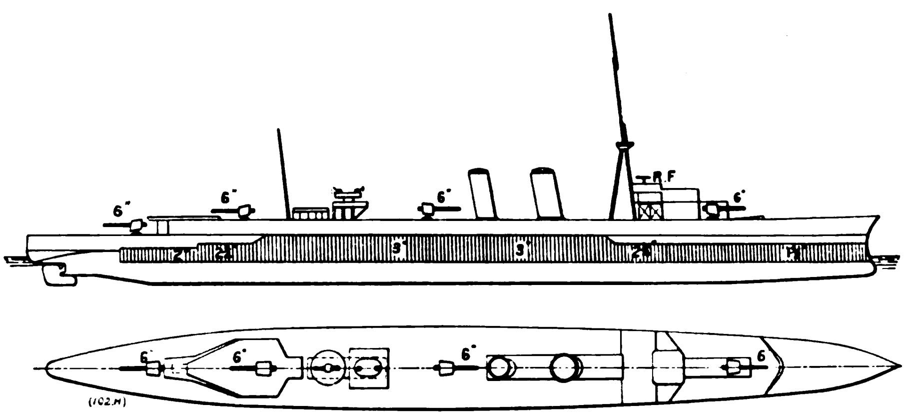
Comus.



Length (extreme), 446 ft.; Length B.P., 420 ft.; 3,895 tons; Speed, 29 knots; Completed, 1915.
Armament, 4—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 above-water D.R. torpedo tubes.

LIGHT CRUISERS.

Cambrian. **Canterbury.** **Constance.** **Castor.** **Champion.**



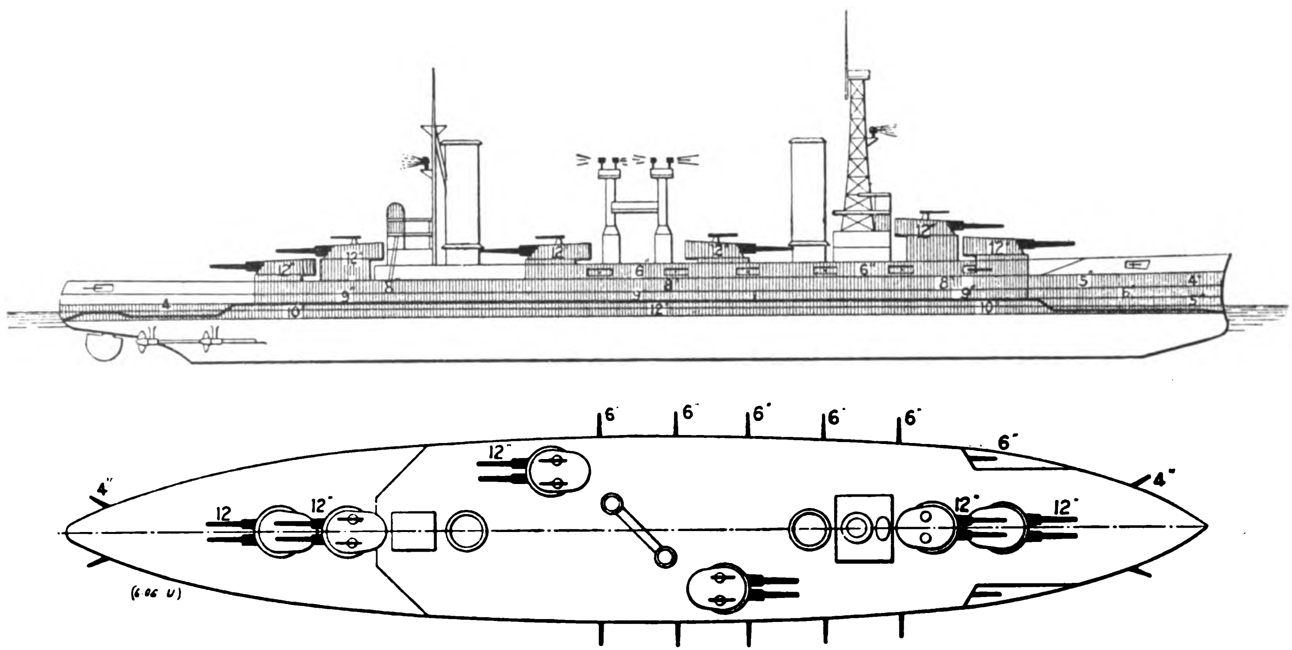
Length (extreme), 446 ft. 6 ins.; Length B.P., 420 ft.; 3,920 tons; Speed, 29 knots; Completed, 1915.

Cambrian, Canterbury, Constance, Castor	Armament, 4—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged torpedo tubes.
Champion	Armament, 4—6-in.; 1—3-in. A.A.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged torpedo tubes.

ARGENTINE.

BATTLESHIPS.

Moreno. **Rivadavia**

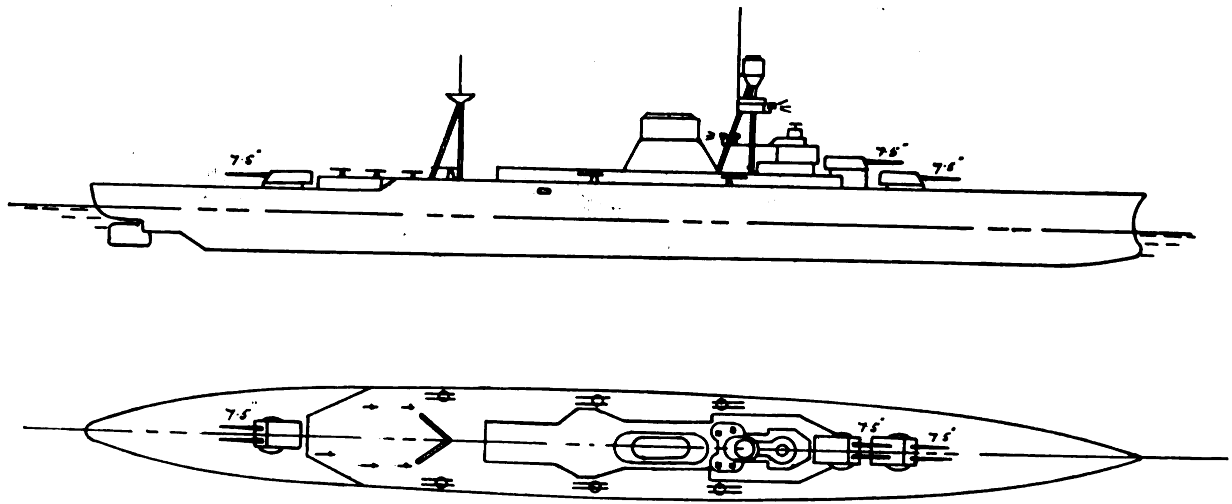


Length (extreme), 585 ft. ; Length on W.L., 575 ft. ; 27,940 tons ; Speed, 22½ knots ; Completed, 1914-15.
Armament, 12—12-in. ; 12—6-in. ; 4—3-in. A.A. ; 4—3-pr. ; 6 M. ; 4 L. ; 4 torpedo tubes.

ARGENTINE.

CRUISERS.

Almirante Brown. **25 Maio.**

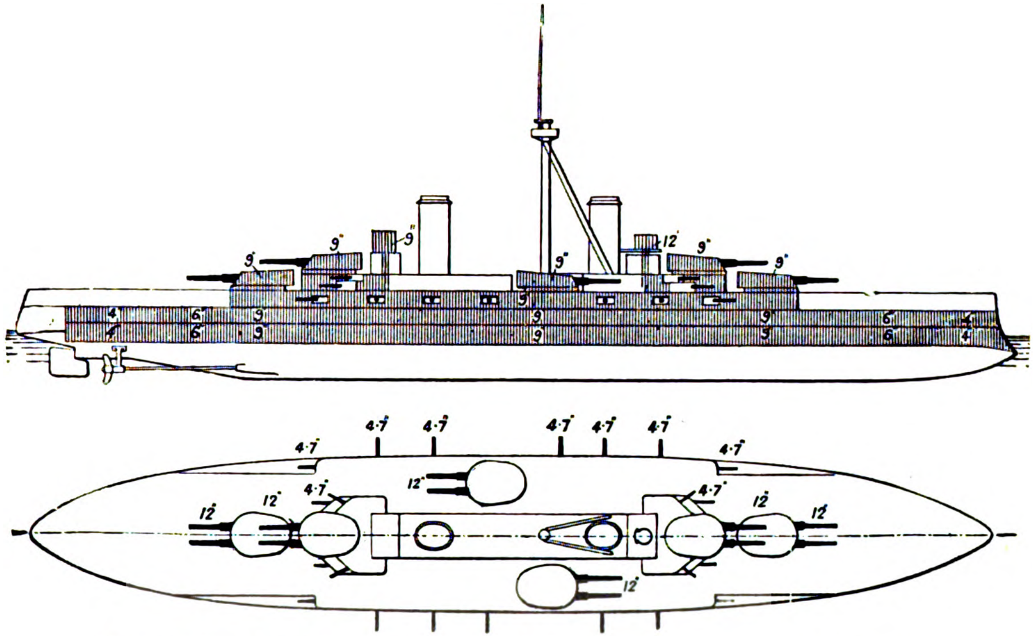


Length (waterline), 546 ft.; 6,495 tons; Speed, 32 knots.
Armament, 6—7·5-in.; 12—4-in. A.A.; 6 Pom Poms; 6 torpedo tubes.

BRAZIL

BATTLESHIPS.

Minas Geraes. **São Paulo.**

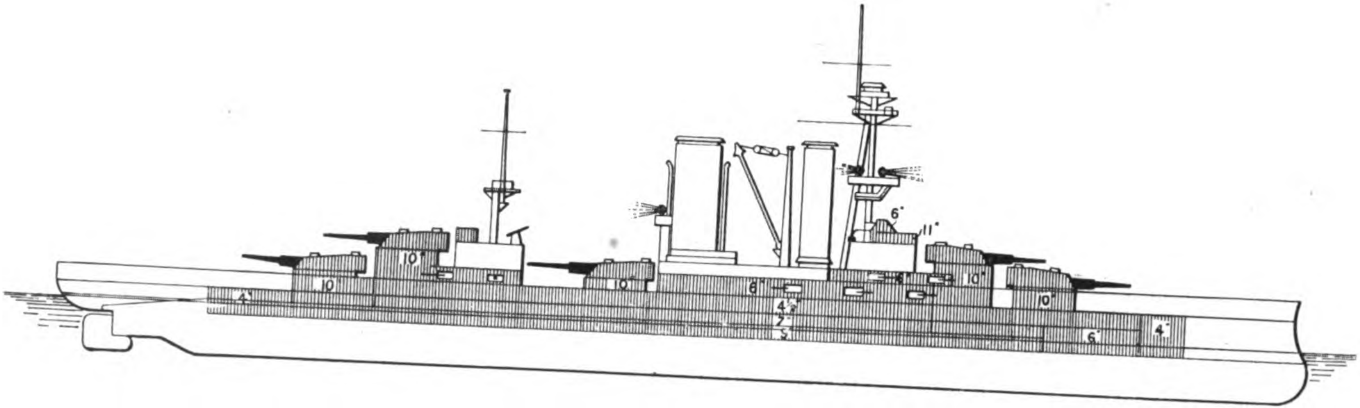


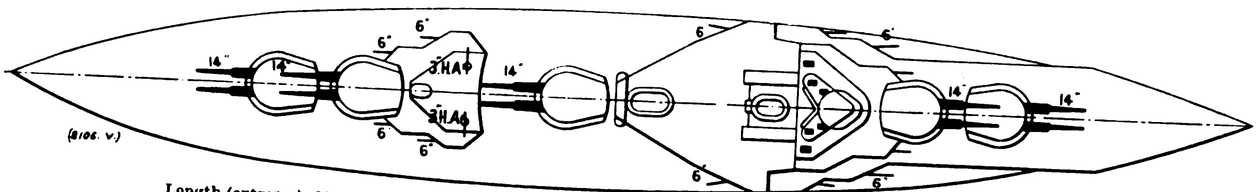
Length (extreme), 543 ft. ; Length B.P., 500 ft. ; 19,281 tons ; Speed, 21·5 knots ; Completed, 1909, 1910.
Armament, 12—12-in. ; 22—4·7-in. ; 8—3-pr. ; 2—3-in A.A. ; 4 M.
Overhauled and refitted at Brooklyn Navy Yard, 1921-22, and A.A. guns installed.

CHILE.

BATTLESHIP.

Almirante Latorre (*formerly* H.M.S. Canada)





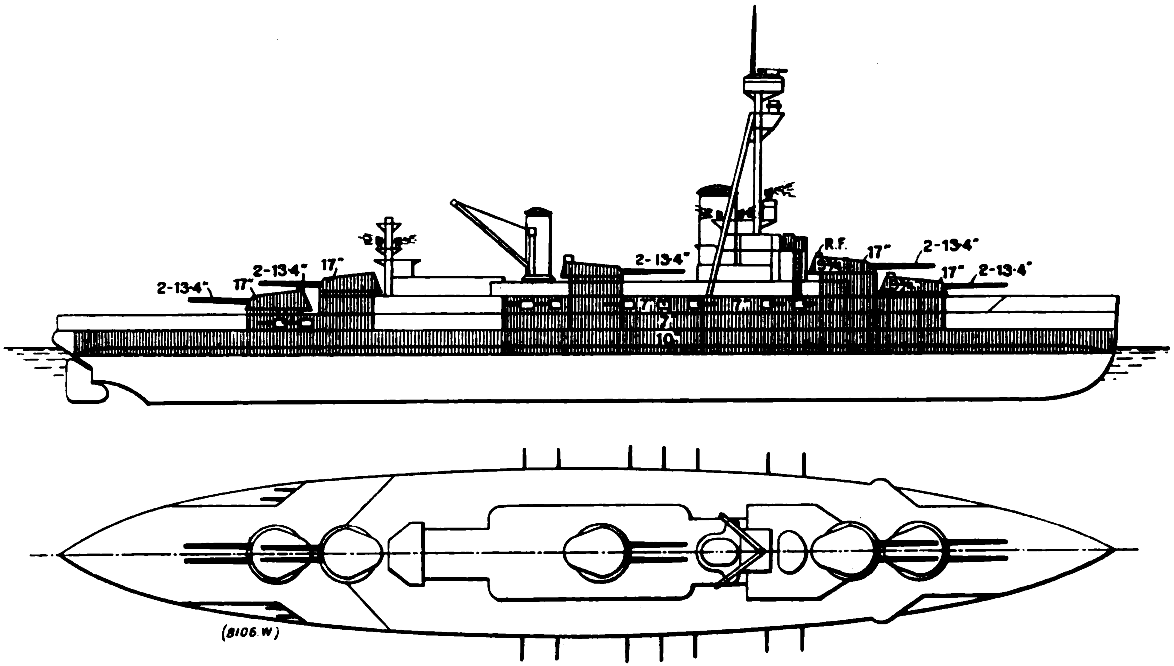
Length (extreme), 661 ft. ; Length B.P., 625 ft. ; 28,000 tons ; Speed, 23 knots ; Completed, 1915 ; Modernised, 1931.*
Armament, 10–14-in. ; 14–6-in. ; 2–3-in. A.A. ; 4–3-pr.

* During modernisation main topmast has been raised and bridge platforms extended.

FRANCE.

BATTLESHIPS.

Bretagne. **Lorraine.** **Provence.**

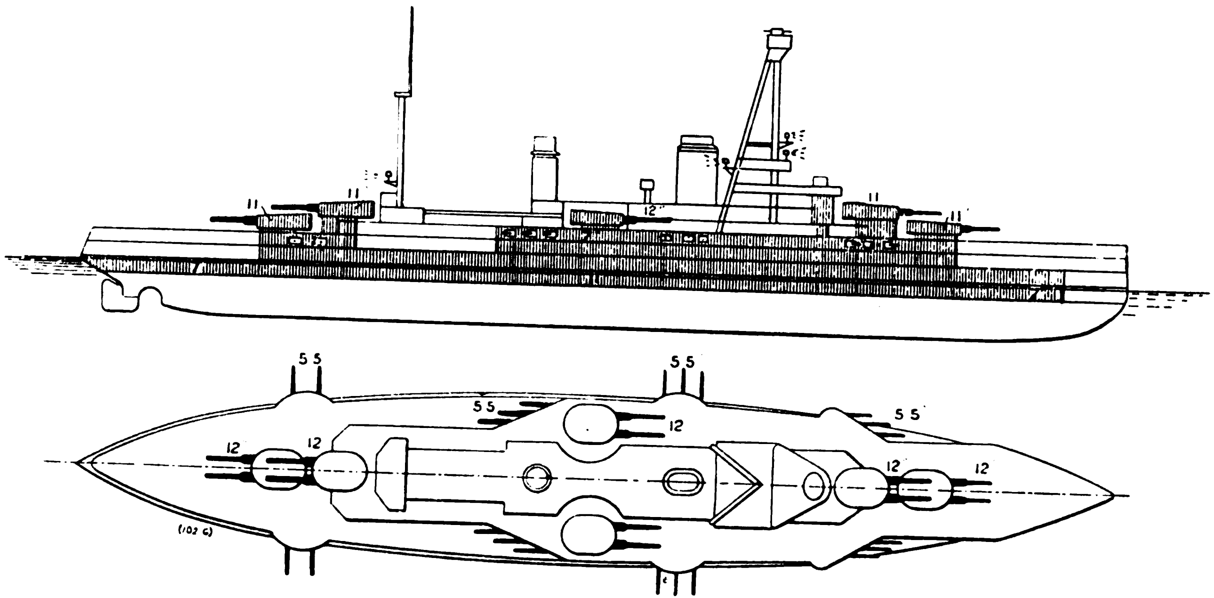


Length (extreme), 544 ft. 6 ins.; 23,128 tons; Speed, 20 knots; Completed, 1915–16; Reconstructed, 1919–20.
Armament, 10—13·4-in.; 18—5·5-in.; 4—3-in. A.A.; 5—3-pr.; 2—1-pr.

FRANCE

BATTLESHIPS.

Jean Bart. **Courbet.** **Paris.**

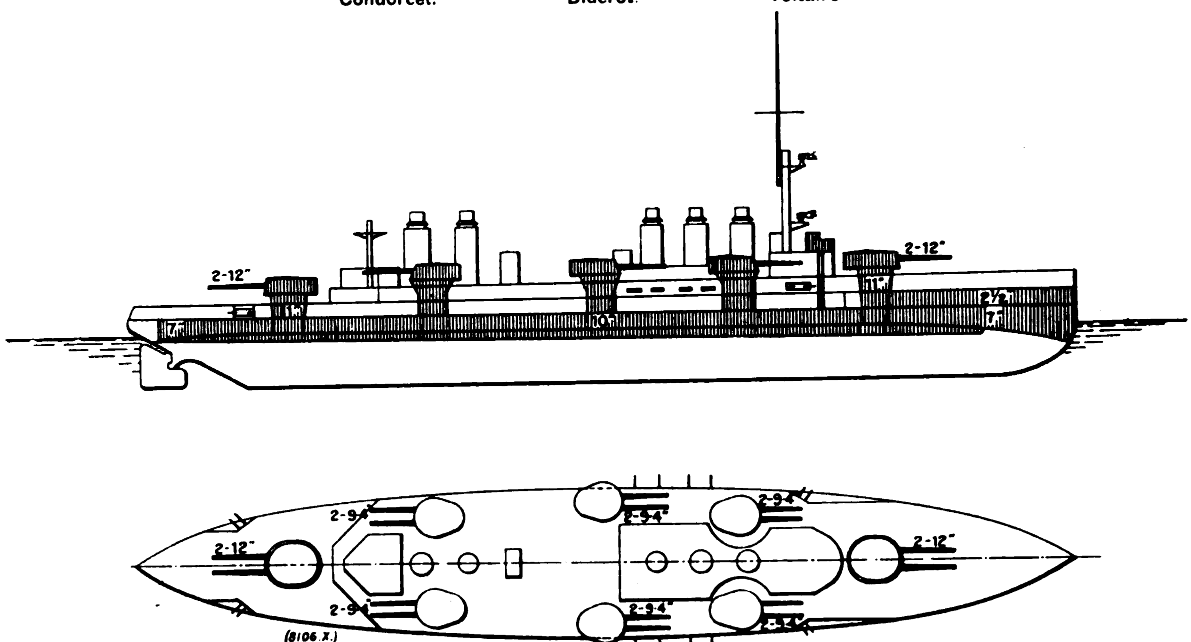


Length (extreme), 544 ft. 6 ins.; Length B.P., 541 ft. 4 ins.; 23,128 tons; Speed, 20 knots; Completed, 1913-14.
Armament, 12—12-in.; 22—5·5-in.; 4—3-in. A.A.; 4—3-pr.; 2—1-pr. (Courbet has 3—3-pr.)

FRANCE.

BATTLESHIPS.

Condorcet. Diderot. Voltaire

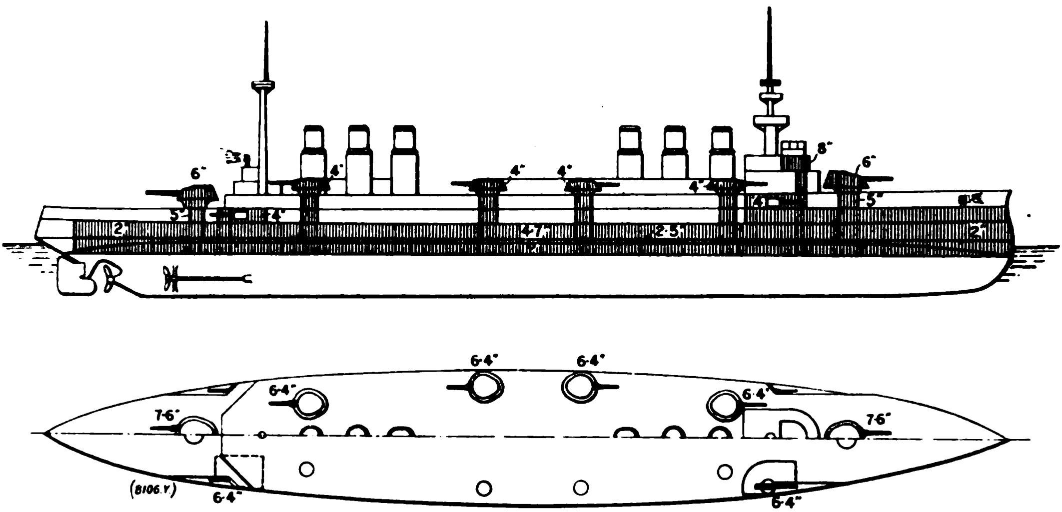


Length (extreme), 481 ft.; Length W.L., 475 ft. 9 ins.; Speed, 19¼ knots; 18,592 tons; Completed, 1911
Armament, 4—12-in.; 12—9·4-in.; 12—3-in.; 2—3-in. A.A.; 4—3-pr. A.A.; 2—1-pr.; 2 L.; 2 torpedo tubes.

FRANCE.

ARMOURED CRUISERS.

Ernest Renan. **Jules Michelet**

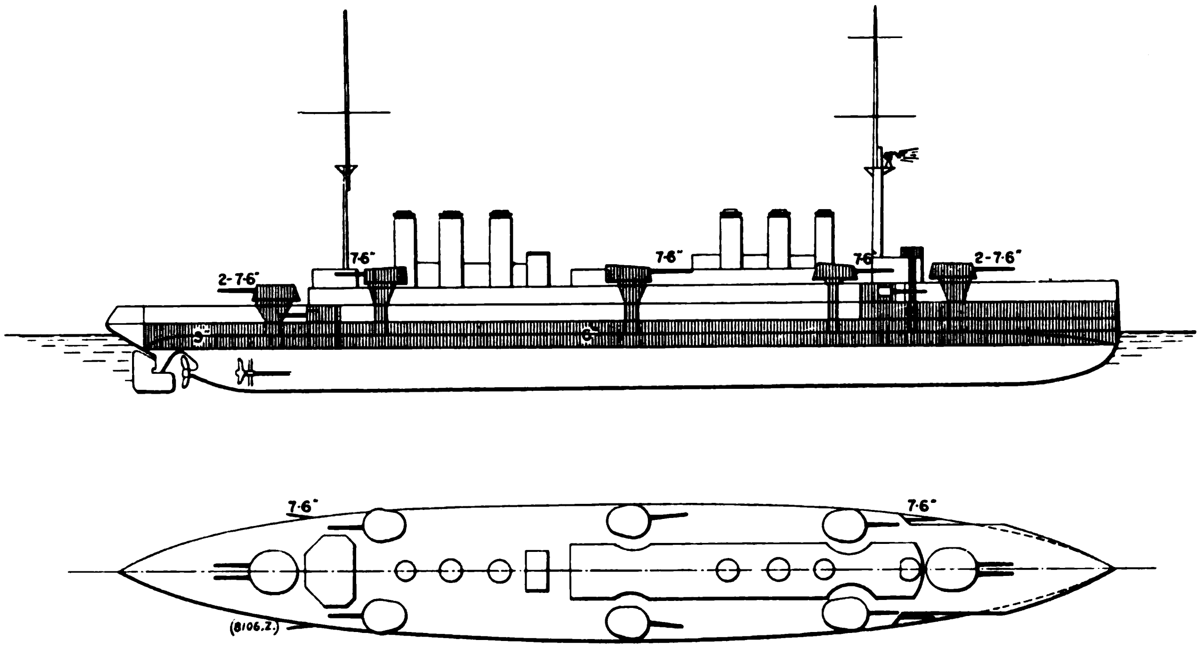


Length, 521 ft. 7 ins. and 489 ft.; 13,500 tons and 12,400 tons; Speed, 23 knots and 22 knots; Completed, 1909 and 1908.
Armament: Ernest Renan, 4—7·6-in., 12—6·5-in.; 4—3-in.; 2—3-in. A.A.; 8—9-pr.; 2—1-pr.; 2 torpedo tubes.
Jules Michelet, 4—7·6-in.; 12—6·5-in.; 2—3-in. A.A.; 10—3-pr.; 2 M.; 2 torpedo tubes.

FRANCE.

ARMOURED CRUISER.

Waldeck Rousseau.

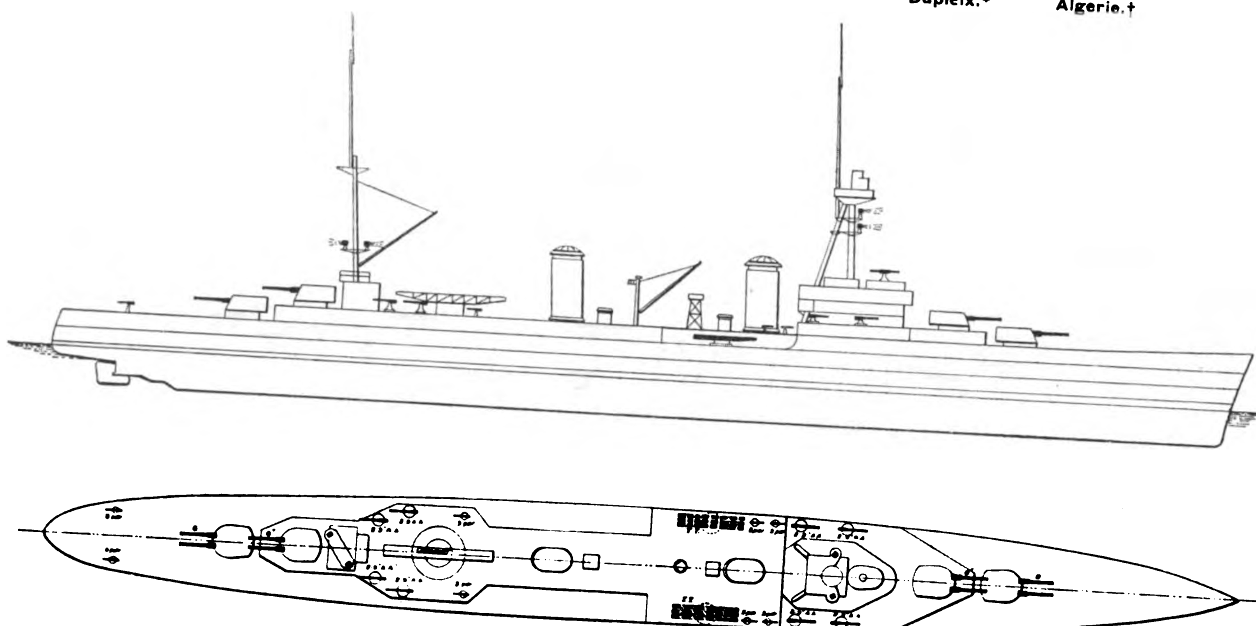


Length (extreme), 521 ft. 4 ins.; Length, W.L., 515 ft.; Speed, 23 knots; 13,828 tons; Completed, 1911.
Armament, 14—7·6-in.; 10—3-in.; 10—9-pr. A.A.; 2—3 pr.; 2 M.; 2 torpedo tubes.

FRANCE.

CRUISERS.

Duquesne. Tourville. Suffren.* Colbert.* Foch.* Dupleix.* Algerie.†



Length (extreme), 607 ft. (Duquesne and Tourville, 626 ft. 8 in.); 10,000 tons; Speed, 33 knots.
Armament, 8—8-in., 8—3-in. A.A. (Dupleix and Suffren have 8—3·5-in. A.A.); 8—1-pr.; 2—triple T.T.'s. Fitted with a catapult. Carries 2 seaplanes.

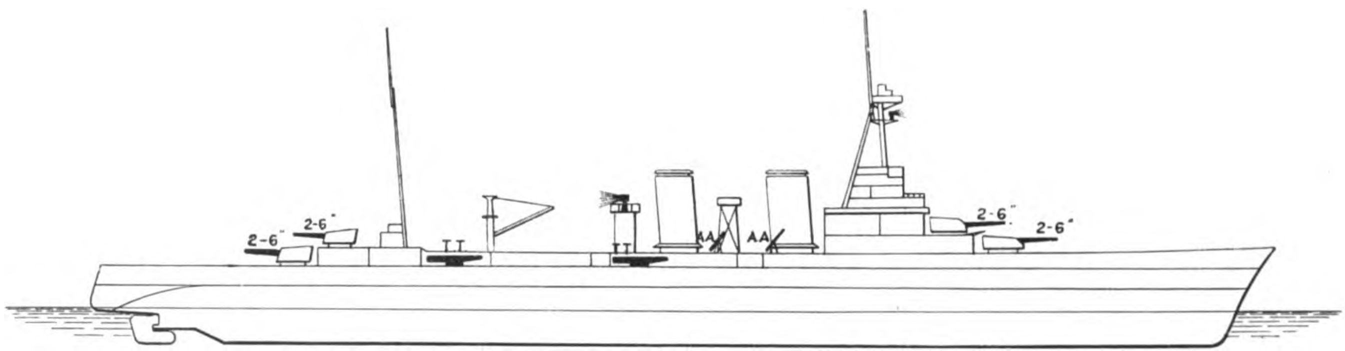
* These differ slightly from the above plan in details of bridges, cranes, catapult, etc. Foch and Colbert have tripod mainmasts.

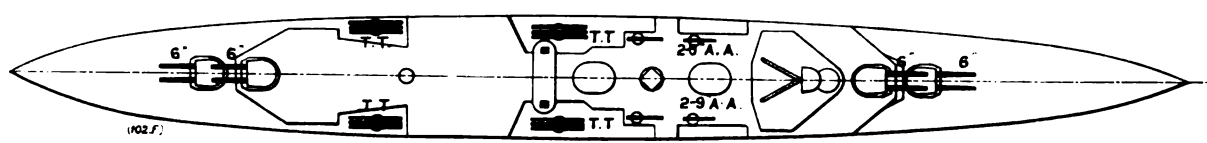
† Algerie is reported to have a flush deck and one large funnel only.

FRANCE.

LIGHT CRUISERS.

La Motte Piquet. Duguay-Trouin. Primauguet.





Length (extreme), 594 ft. 10 ins.; Length B.P., 575 ft.; 7,249 tons; Speed, 34 knots. First two ships of class laid down in August, 1922, and January, 1923. Completed, 1926.

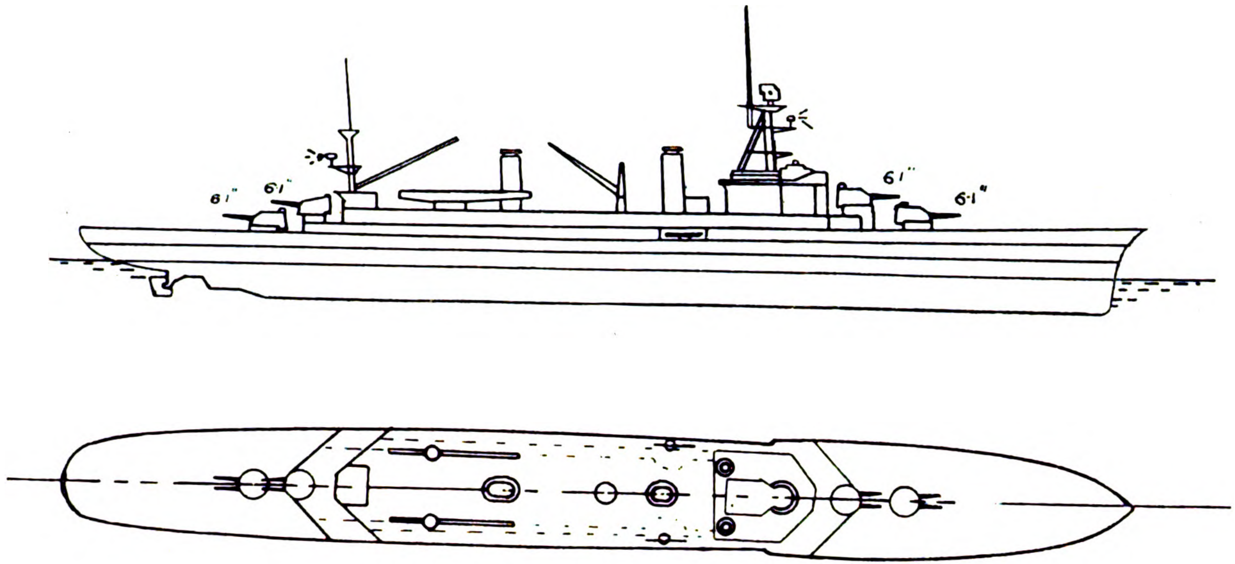
Armament, 8—6·1-in.; 4—3-in. A.A.; 2—3-pr.; 2 M.; 1 L.; 4 triple torpedo tubes (21·7-in. torpedoes).

NOTE.—Reported to have protection to magazines.

FRANCE.

TRAINING CRUISER.

Jeanne d'Arc.

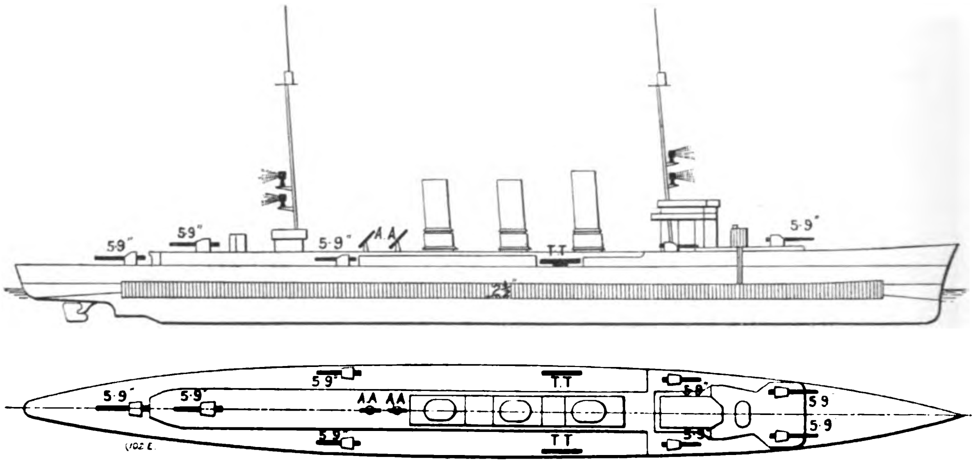


Length (extreme), 557 ft. 8 ins.; 6,500 tons; Speed, 26·5 knots.
Armament, 8—6·1-in.; 4—3-in. A.A.; 2—1·6-in.; 2 M.; 2 torpedo tubes. 2 catapults; 2 seaplanes.

FRANCE.

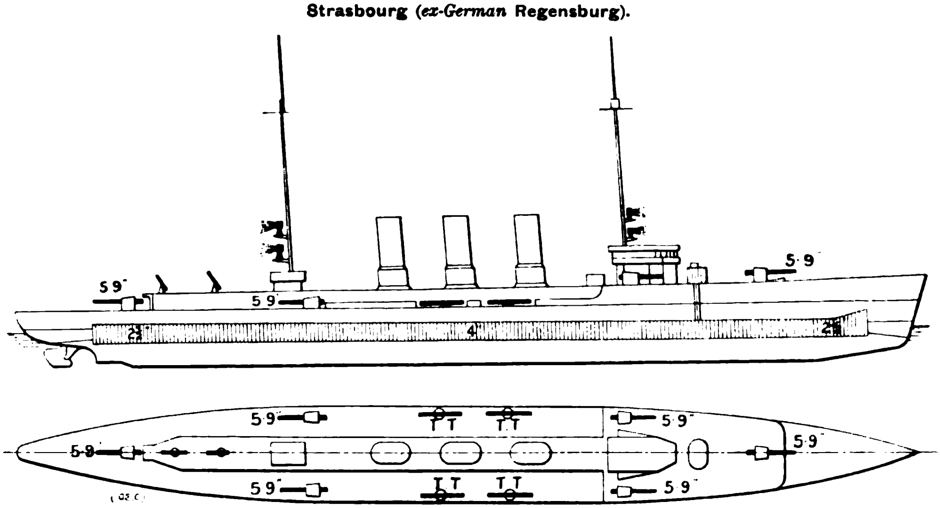
LIGHT CRUISERS.

Metz (*ex-German* Königsberg).



Length (water-line), 489 ft.; 5,265 tons; Speed, 27·5 knots; Completed, 1916.
Armament, 8—5·9-in.; 2—3-in. A.A.; 4 M.; 4 torpedo tubes (2 above water, 2 submerged).

Strasbourg (*ex-German* Regensburg).

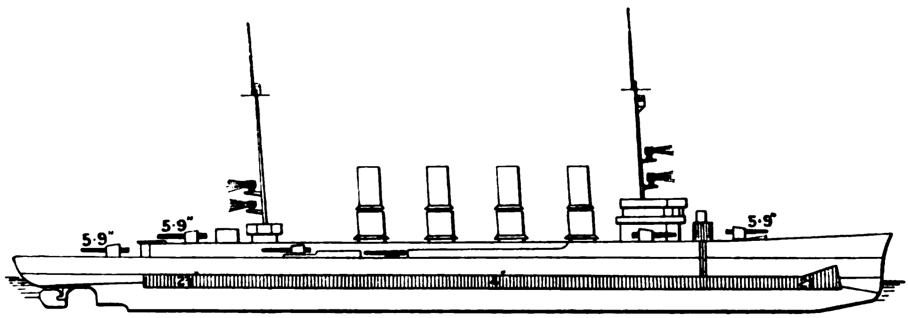


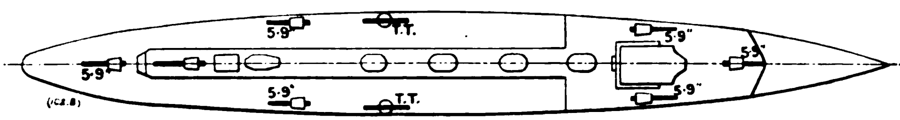
Length (extreme), 468 ft.; Length (water-line), 456 ft.; 4,723 tons; Speed, 26 knots; Completed, 1914.
Armament, 7—5·9-in.; 1—3-in. A.A.; 4 torpedo tubes (19·7-in. torpedoes).

FRANCE

LIGHT CRUISER.

Mulhouse (*ex-German* Stralsund).

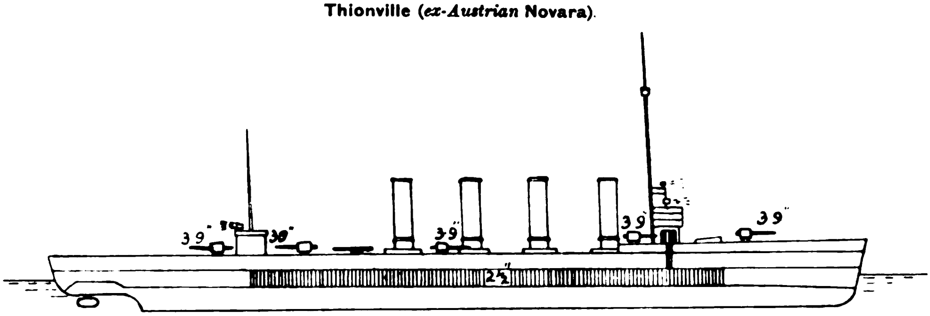


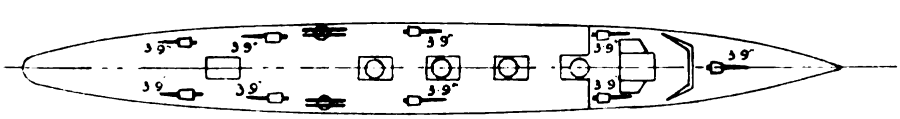


Length (water-line), 446 ft. 8 ins. ; 4,529 tons ; Speed, 26½ knots ; Completed, 1913.
Armament, 7—5·9-in. ; 2—3-in. A.A. ; 2 M. ; 2 torpedo tubes (19·7-in. torpedoes).

LIGHT CRUISER.

Thionville (*ex-Austrian* Novara).



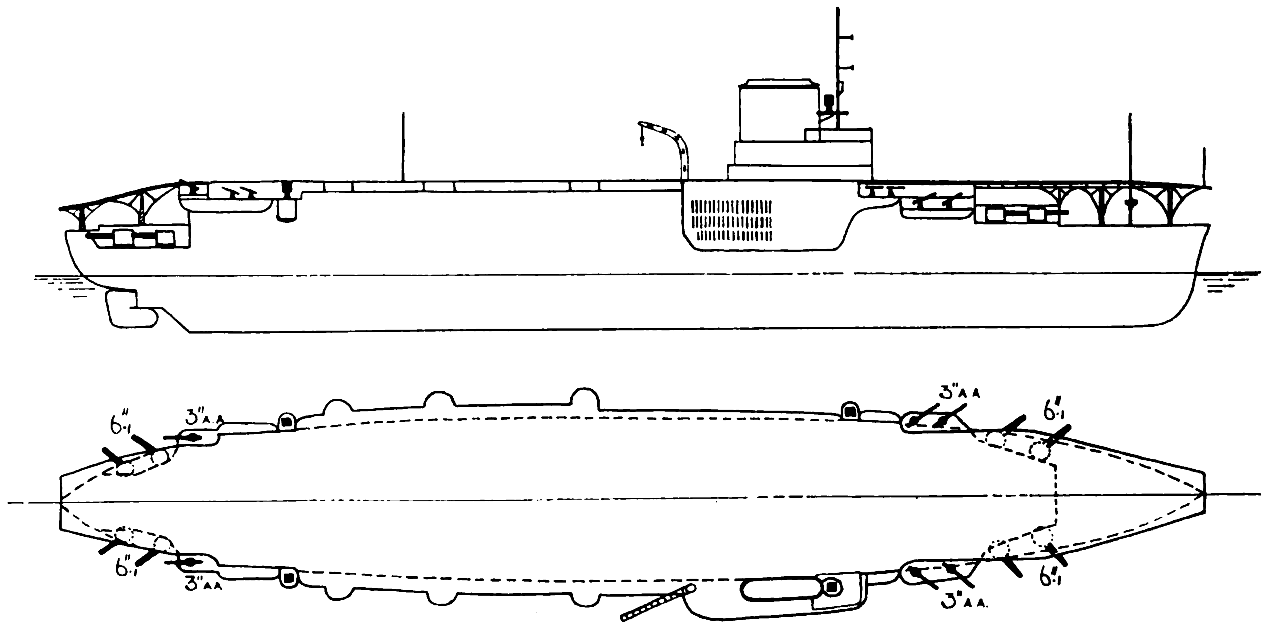


Length (extreme), 428 ft. 6 ins. ; 2,922 tons ; Speed, 27 knots.
Armament, 9—3·9-in. ; 2—3-in. A.A. ; 2 twin above-water torpedo tubes.

FRANCE.

AIRCRAFT CARRIER.

Béarn.

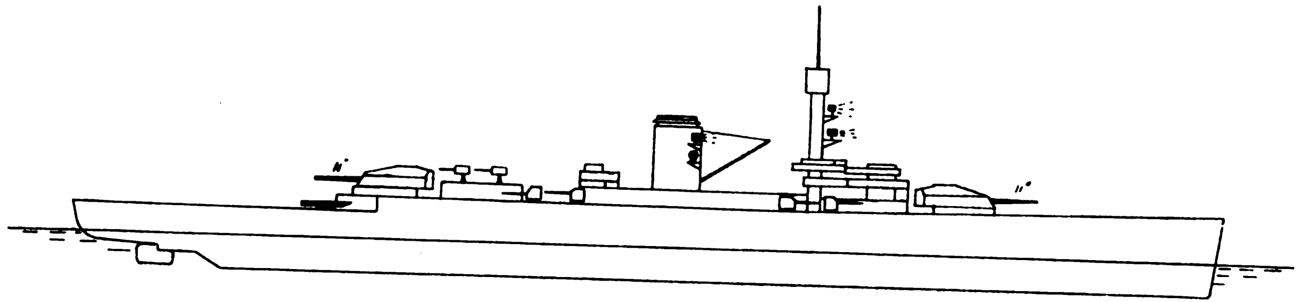


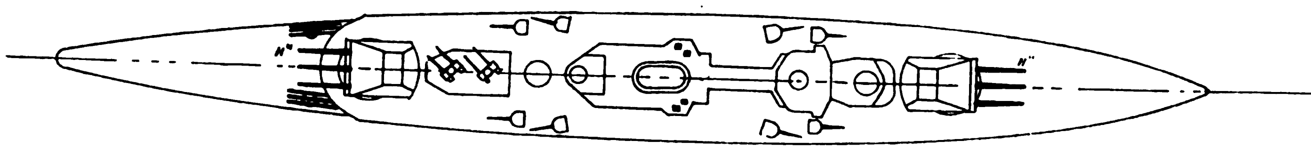
Length (extreme), 597 ft. ; 22,146 tons ; Speed, 21·6 knots.
Armament, 8—6·1-in. ; 6—3-in. A.A. ; 8—1-pr. A.A. ; 12 M. A.A. ; 41 planes.

GERMANY.

BATTLESHIP.

Deutschland (*formerly known as* **Ersatz Preussen**)



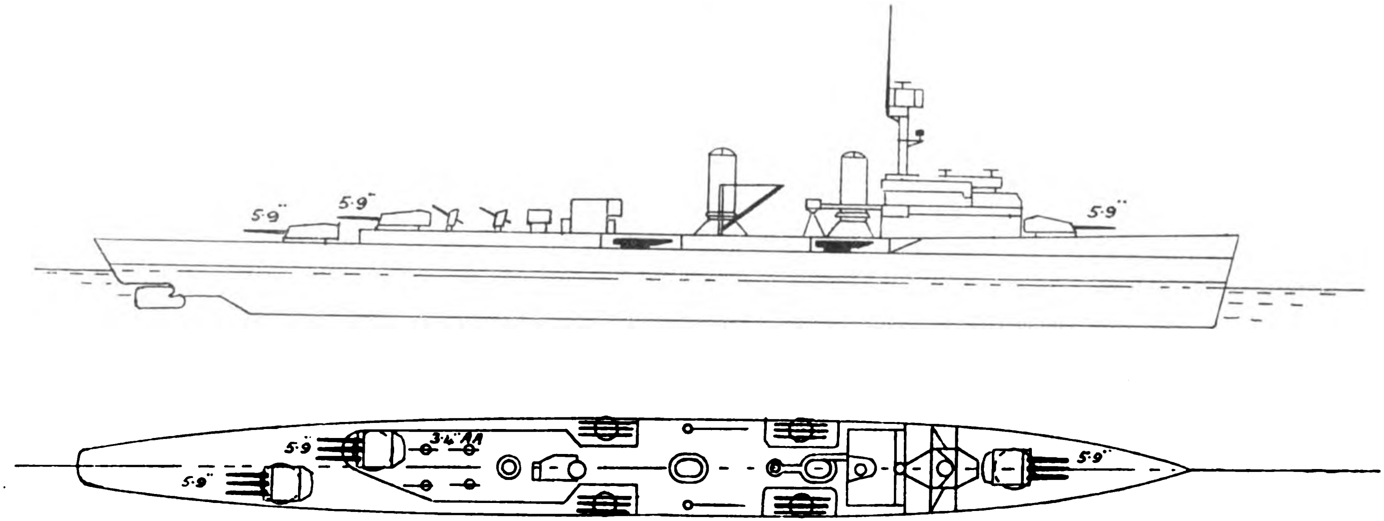


**Length (extreme), about 590 ft. ; 10,000 tons ; Speed, 26 knots.
Armament, 6—11-in. : 8—5·9-in. ; 4—3-in. A.A. ; 6 torpedo tubes.**

GERMANY.

LIGHT CRUISERS.

Königsberg. **Karlsruhe.** **Köln.**

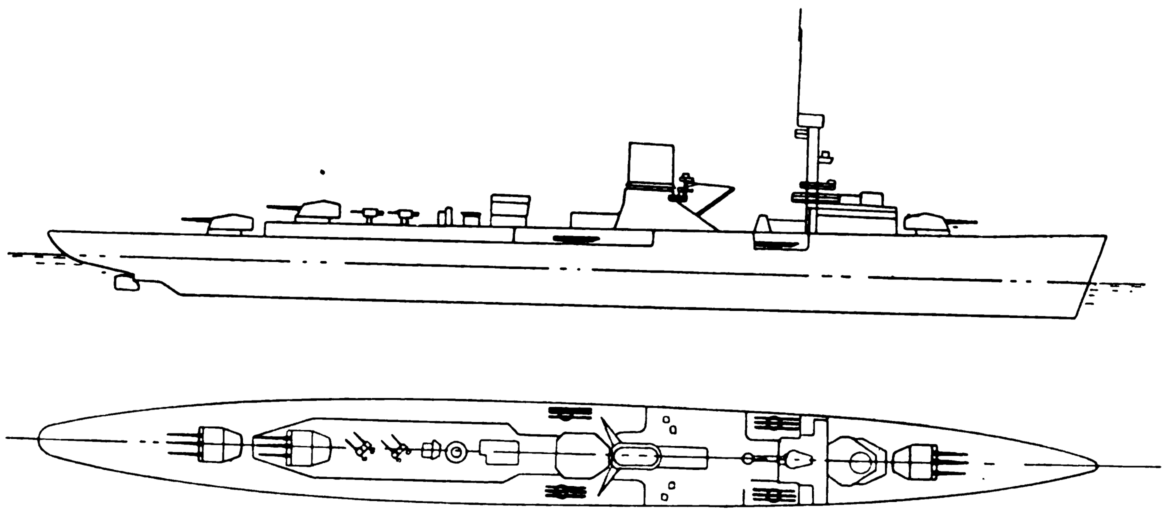


Length (extreme), 570 ft. 10 ins.; 6,000 tons; Speed, 32 knots.
Armament, 9—5·9-in.; 4—3·4-in. A.A.; 4 triple torpedo tubes.

GERMANY.

LIGHT CRUISER,

Leipzig.

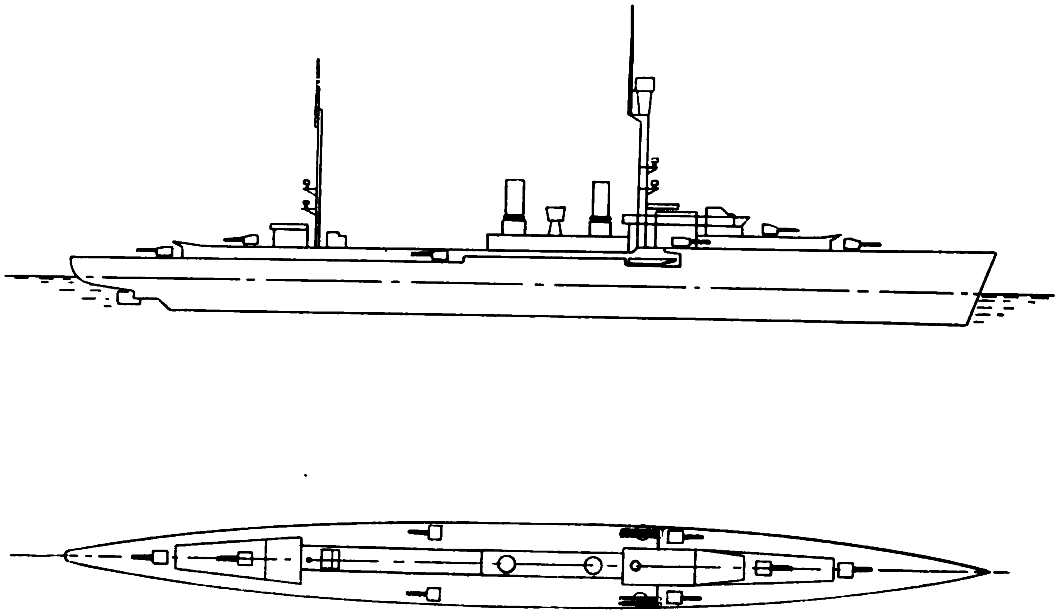


Length (W.L.), 543 ft. 10 ins.; 6,000 tons; Speed, 32 knots.
Armament, 9—5·9 in.; 4—3·4 in. A.A.; 4 triple torpedo tubes.

GERMANY.

LIGHT CRUISER.

Emden

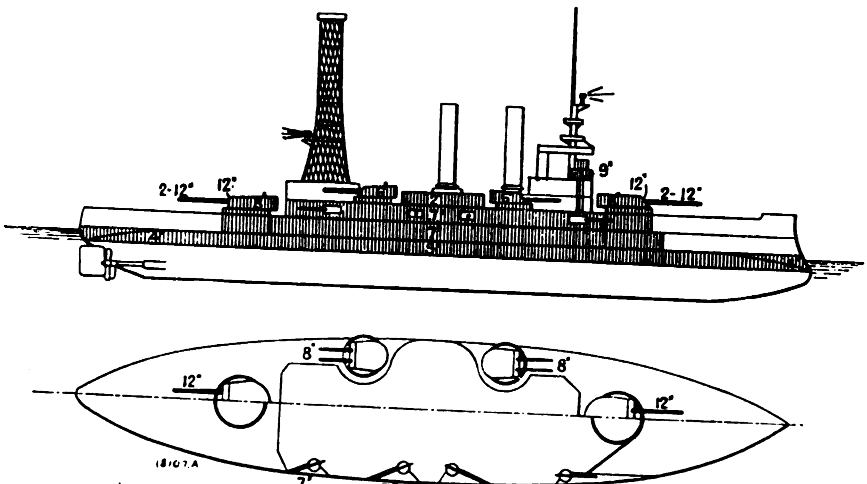


Length (extreme), 510 ft. 2 ins.; 6,000 tons; Speed, 29 knots; Completed, 1925.
Armament, 8–5·9-in.; 2–3·5-in. A.A.; 4 torpedo tubes in twin mountings.
The 8–5·9-in. guns will be mounted in twin mountings, 2 forward and 2 aft, when the mountings are ready.

GREECE.

BATTLESHIPS.

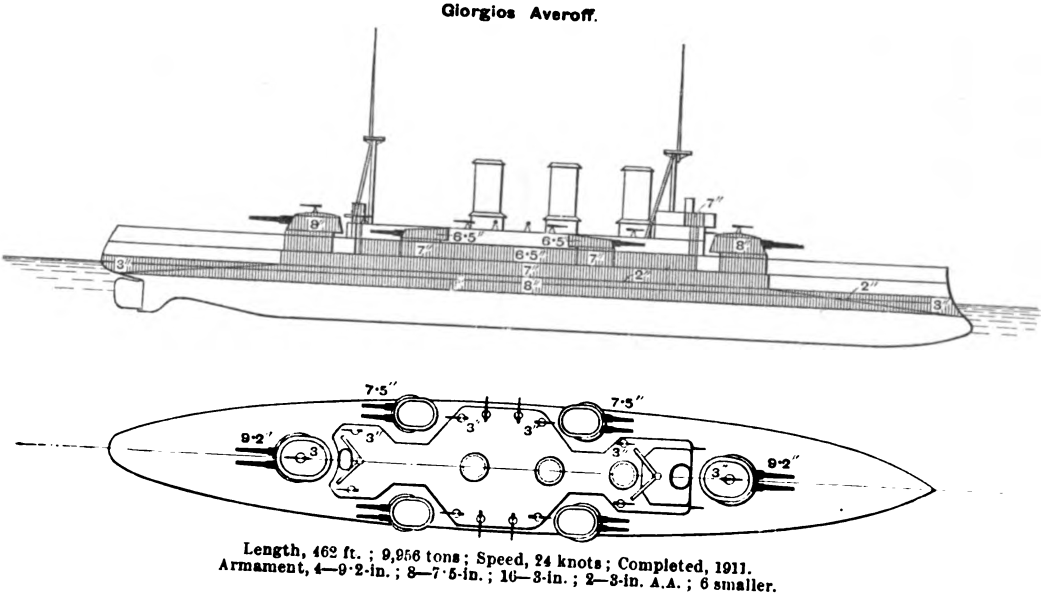
Lemnos (*ex*-**Idaho**). **Kilkis** (*ex*-**Mississippi**).



Length, 382 ft. ; 13,000 tons ; Speed, 17·1 knots ; Completed, 1908 and refitted, 1926—28.
Armament, 4—12-in. ; 8—8-in. ; 8—7-in ; 8—3-in. ; 2—3-in. A.A. ; 4—6-pr. ; 14 smaller ; 2 torpedo tubes.

ARMOURED CRUISER.

Giorgios Averoff.

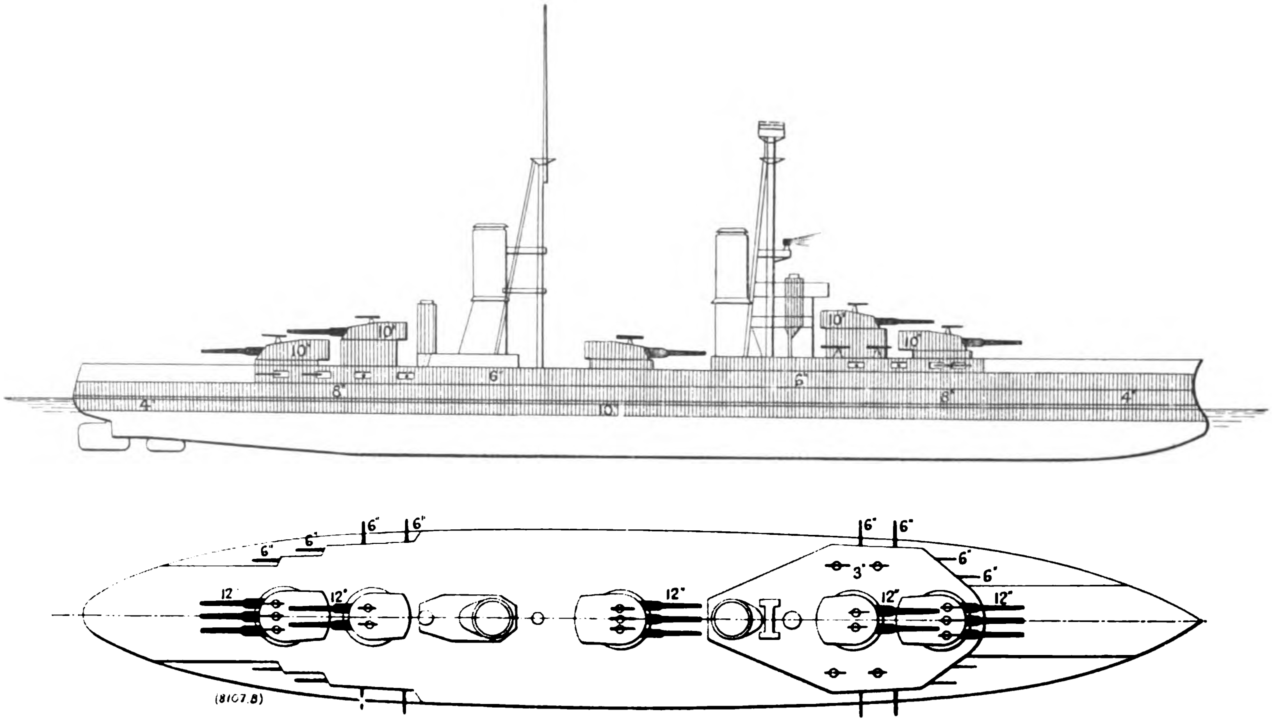


Length, 462 ft. ; 9,956 tons ; Speed, 24 knots ; Completed, 1911.
Armament, 4—9·2-in. ; 8—7·5-in. ; 16—3-in. ; 2—3-in. A.A. ; 6 smaller.

ITALY.

BATTLESHIPS.

Andrea Doria. **Caio Duilio.**

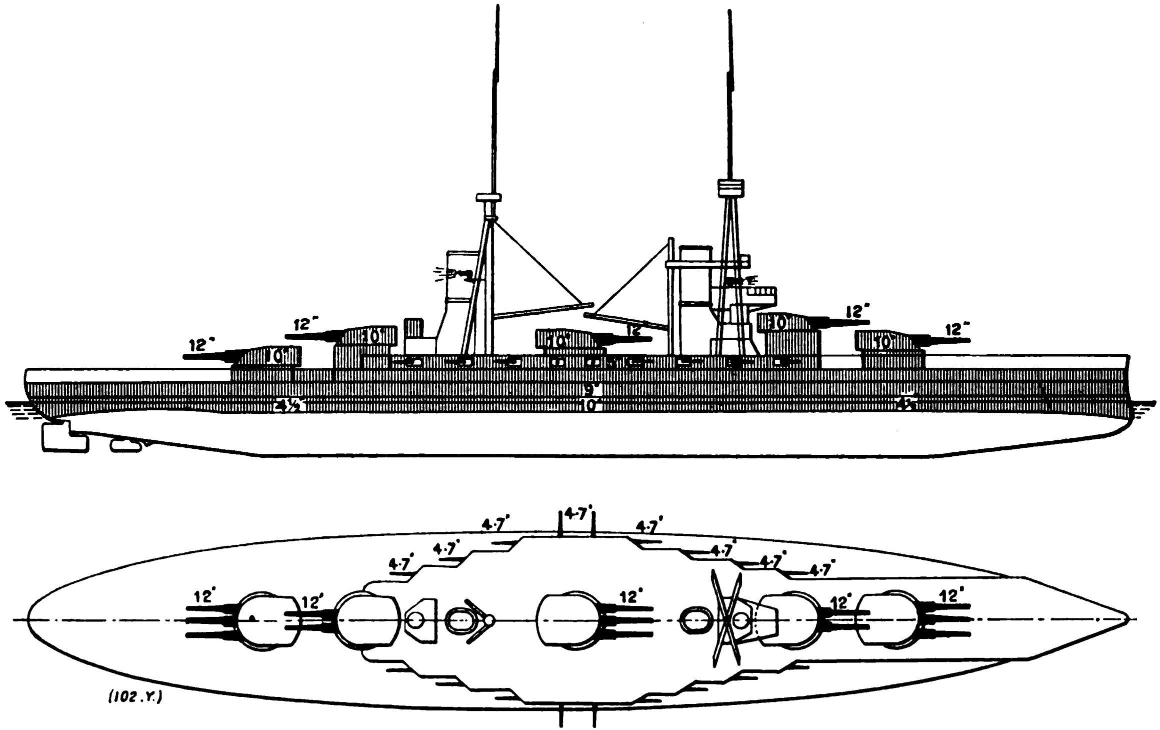


Length (extreme), 575 ft. 9 ins.; Length B.P., 554 ft. 4 ins.; Speed, 22 knots; Completed, 1915.
Armament, 13—12-in.; 16—6-in.; 18—3-in.; 6—3-in. A.A.; 2—2-pr.; 6 M.; 4 L.; 2 torpedo tubes.

ITALY.

BATTLESHIPS.

Conte di Cavour. **Giulio Cesare.**

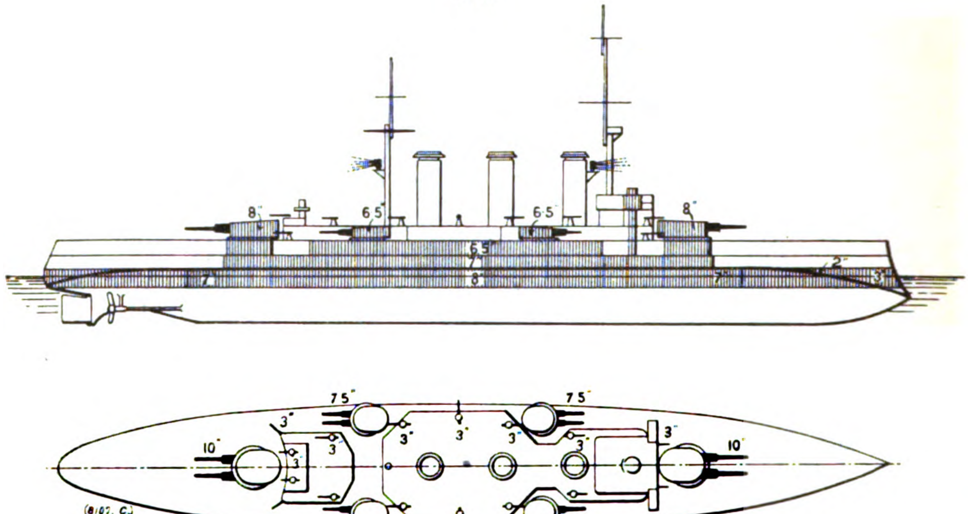


Length (extreme), 575 ft. 9 ins. ; Length B.P., 554 ft. 4 ins. ; Speed, 22 knots ; 22,144 tons ; Completed, 1914–1915.
Armament, 13—12-in. ; 18—4·7-in. ; 13—3-in. ; 6—3-in. A.A. ; 2—2-pr. ; 2 M. ; 4 L.
A fixed catapult is mounted on port side of Forecastle Deck forward.

ITALY.

ARMOURED CRUISER.

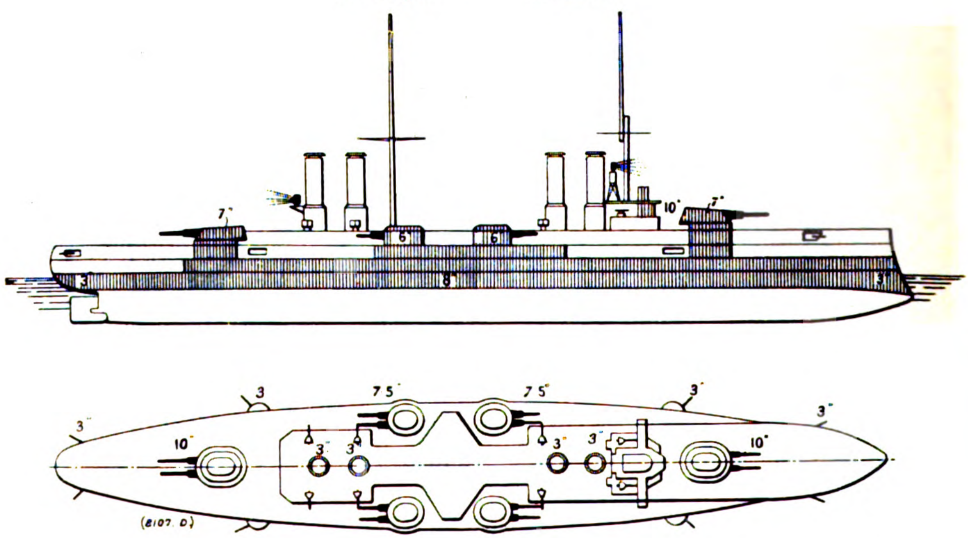
Pisa.



Length (extreme), 460 ft. 11 ins. ; Length B.P., 426 ft. 6 ins. ; Speed, 23 knots ; 8,759 tons ; Completed, 1908.
Armament, 4—10-in. ; 8—7·5-in. ; 12—3-in.; 6—3-in. A.A. ; 4 M. ; 2 L. ; 2 torpedo tubes.
Boys' Training Ship.

ARMOURED CRUISERS

S. Giorgio. S. Marco.

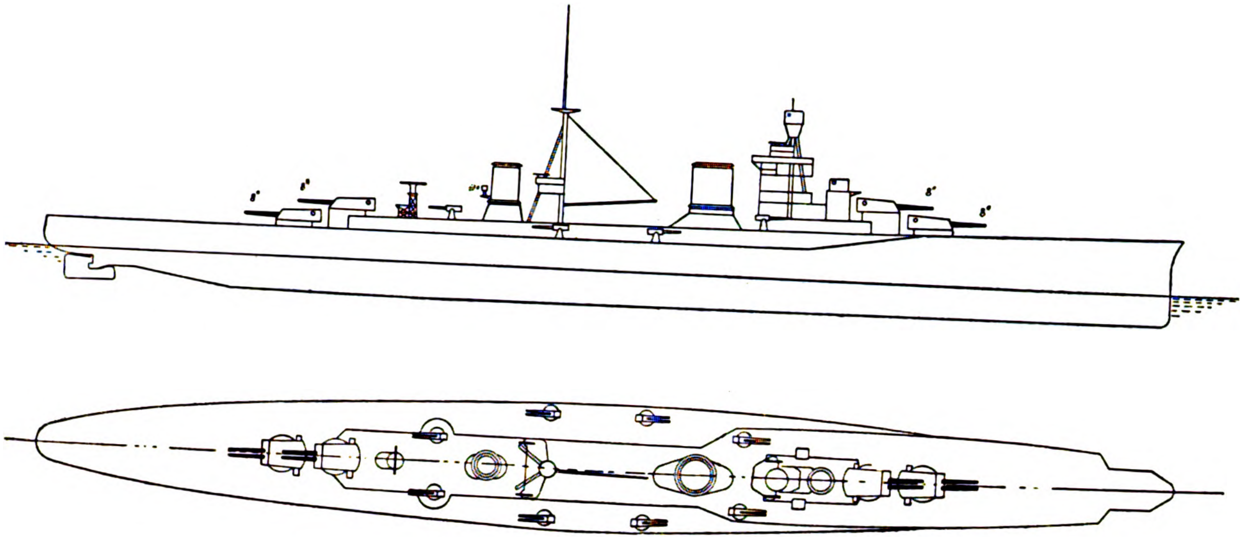


Length (extreme), 462 ft. 2 ins. ; Length B.P., 429 ft. 10 ins. ;
Speed, 22·5 and 23 knots ; 10,000 and 10,920 tons ; Completed, 1910.
Armament, 4—10-in. ; 8—7·5-in. ; 10—3-in. ; 6—3-in. A.A. ; 2—3-pr. ; 6 M. ; 2 L. ; 2 torpedo tubes.

ITALY.

CRUISER.

Bolzano.

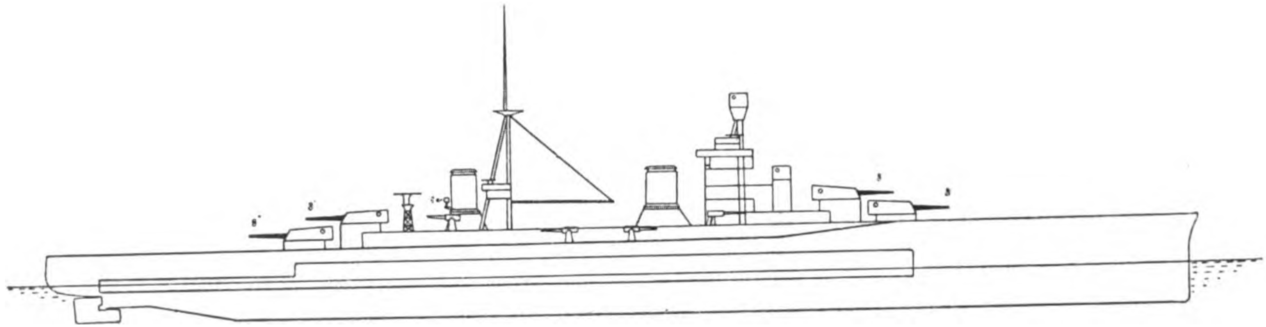


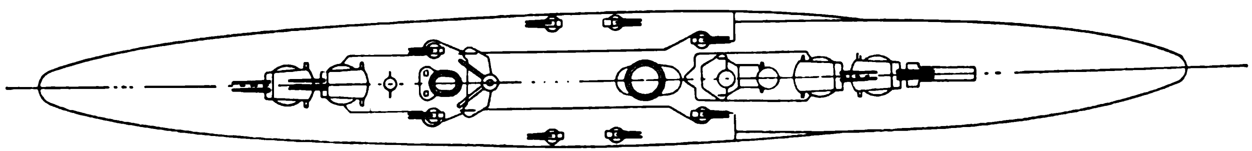
Length B.P., 644 ft.; 10,000 tons; Building.
Armament, 8—8-ins.; 16—3·9-in. A.A.; 12 smaller.
8 torpedo tubes may be fitted.

ITALY.

CRUISERS.

Pola. Zara. Fiume. Gorizia.



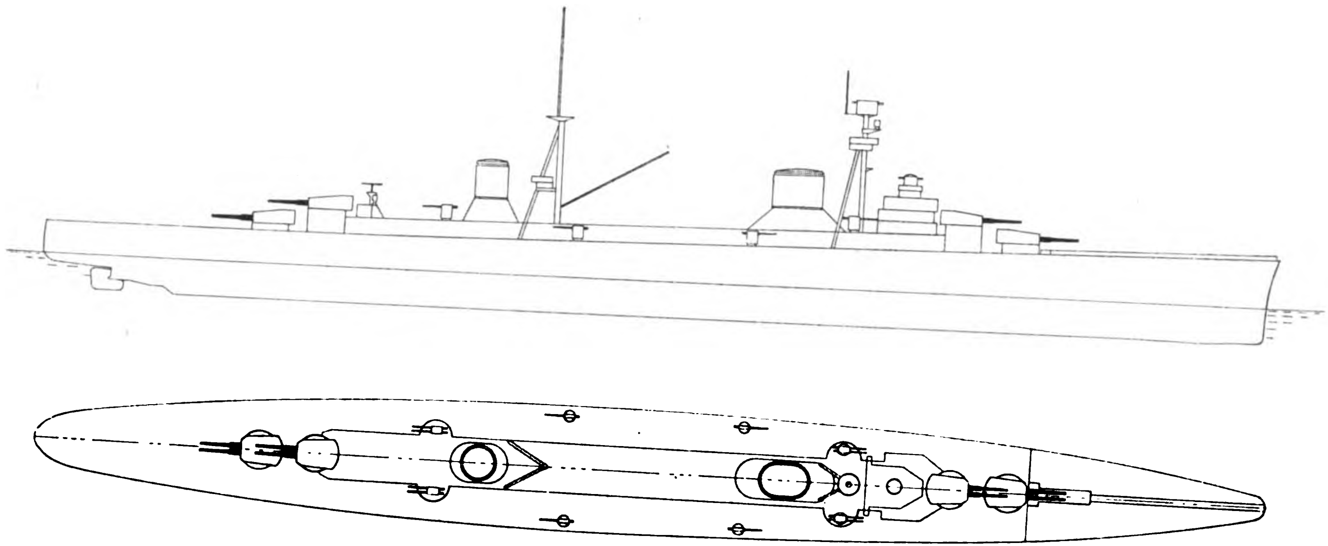


Length (Zara and Fiume), 600 ft.; 10,000 tons; Speed, 32 knots.
Armament, 8—8-in., 16—3·9-in.; 12 smaller.

ITALY.

CRUISERS.

Trento. Trieste.



Length (extreme), 640 ft. 9 ins. ; 10,000 tons ; Speed, 35 knots ; Completed, 1928.
Armament, 8—8-in., 16—4-in. ; 2 twin T.T. s.

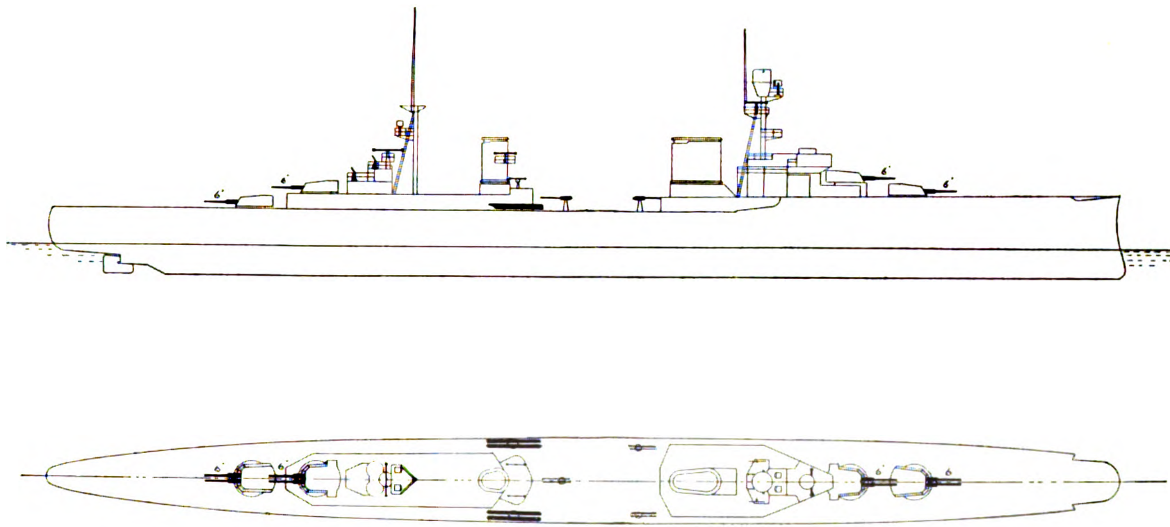
ITALY.

CRUISERS.

Armando Diaz.*
Luigi Cadorna.*

Alberto di Guissano.
Alberico di Barbiano.

Bartolomeo Colleoni.
Giovanni della Bande Nere.

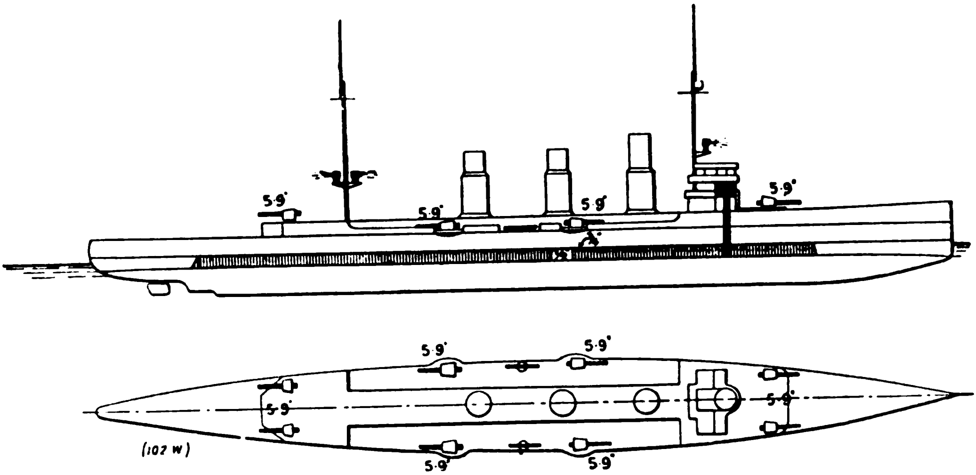


Length (extreme), 559 ft.; 4,896 tons (*5,089 tons); Speed, 37 knots.
Armament, 8–6-in.; 6–4-in. A.A.; and smaller guns; 4 torpedo tubes.
1 catapult and 2 seaplanes.

ITALY.

LIGHT CRUISER.

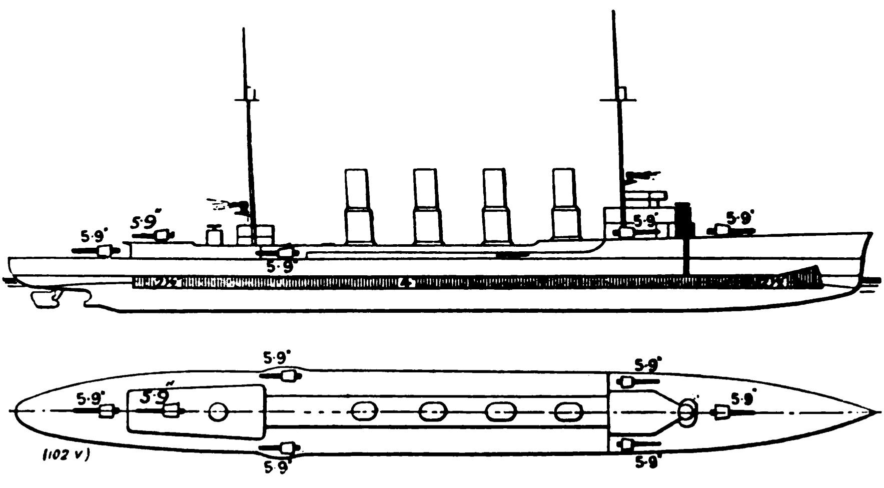
Bari (*ex-German* Pillau)



Length (extreme), 441 ft.; Length B.P., 403 ft.; 3,248 tons; Speed, 27·5 knots; Completed, 1914. Armament, 8—5·9-in.; 3—3-in. A.A.; 2 above-water torpedo tubes (19·7-in. torpedoes); 120 mines.

LIGHT CRUISER.

Taranto (*ex-German* Strassburg).

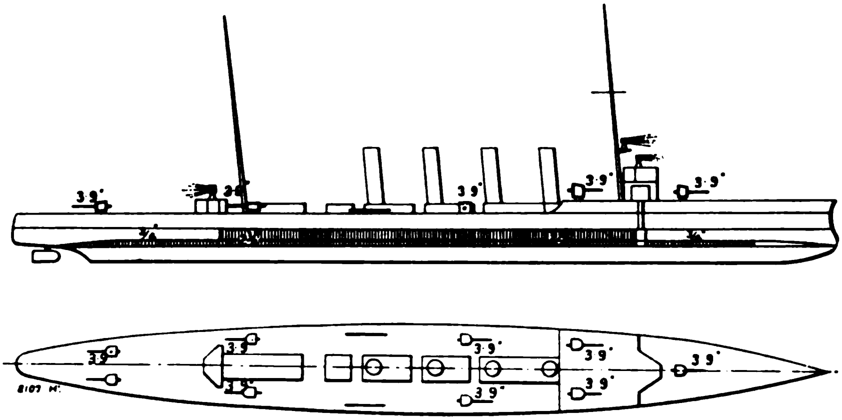


Length (water-line), 446 ft. 3 ins.; 3,184 tons; Speed, 27 knots; Completed, 1912. Armament, 7—5·9-in.; 2—3-in. A.A.; 2 torpedo tubes submerged (19·7-in. torpedoes); 120 mines.

ITALY.

LIGHT CRUISERS.

Venezia (*ex-Austrian* **Saida**). **Brindisi** (*ex-Austrian* **Helgoland**).

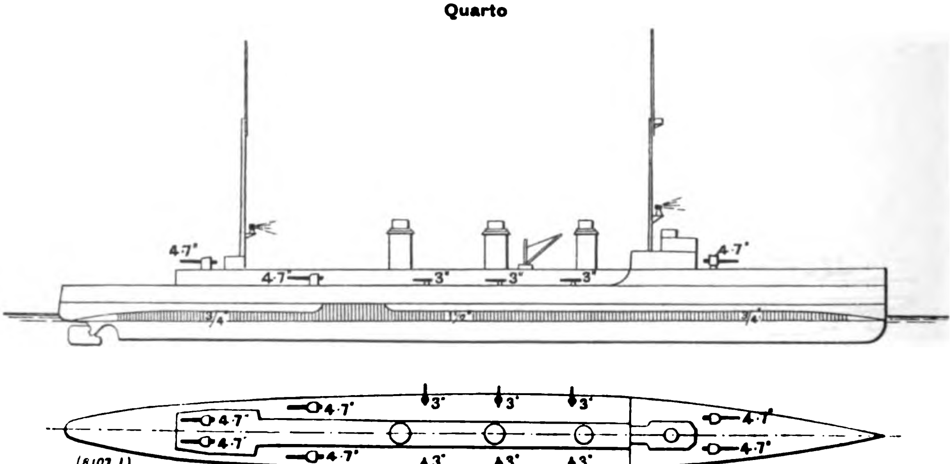


Length (extreme), 430 ft.; Length (W.L.), 416 ft. 9 ins.; Speed, 27 knots; 2,756 tons; Completed, 1914-15.
Armament, 9—3·9-in.; 1—3-in. A.A.; 170 mines; 3 torpedo tubes.

NOTE.—Thionville (*ex-Austrian* Novara), sister ship, allocated to France.

LIGHT CRUISER.

Quarto

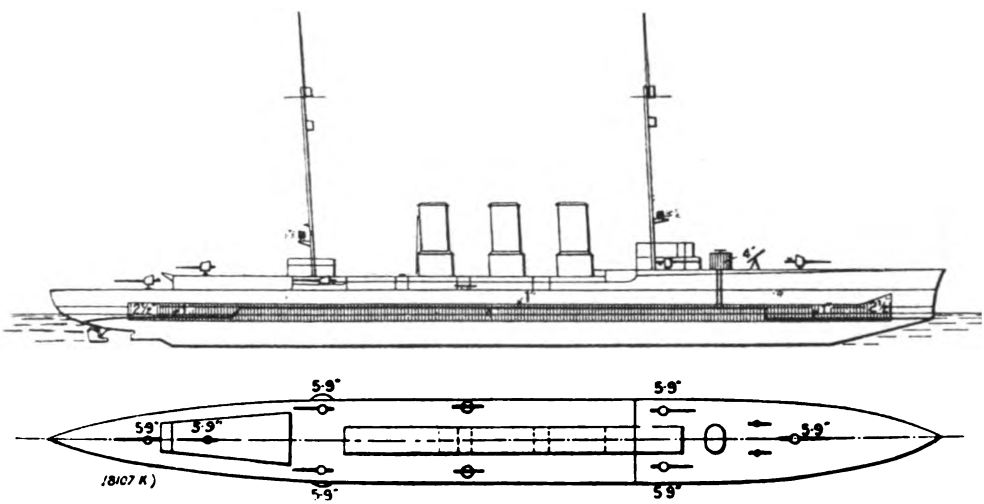


Length (extreme), 431 ft. 9 ins.; Length B.P., 413 ft. 5 ins.; Speed, 28 knots; 2,903 tons; Completed, 1912.
Armament, 6—4·7-in.; 6—3-in.; 2—2-pr. A.A.; 2 above-water 18-in. torpedo tubes; 126 mines.

ITALY.

LIGHT CRUISER.

Ancona (*formerly German* Graudenz)

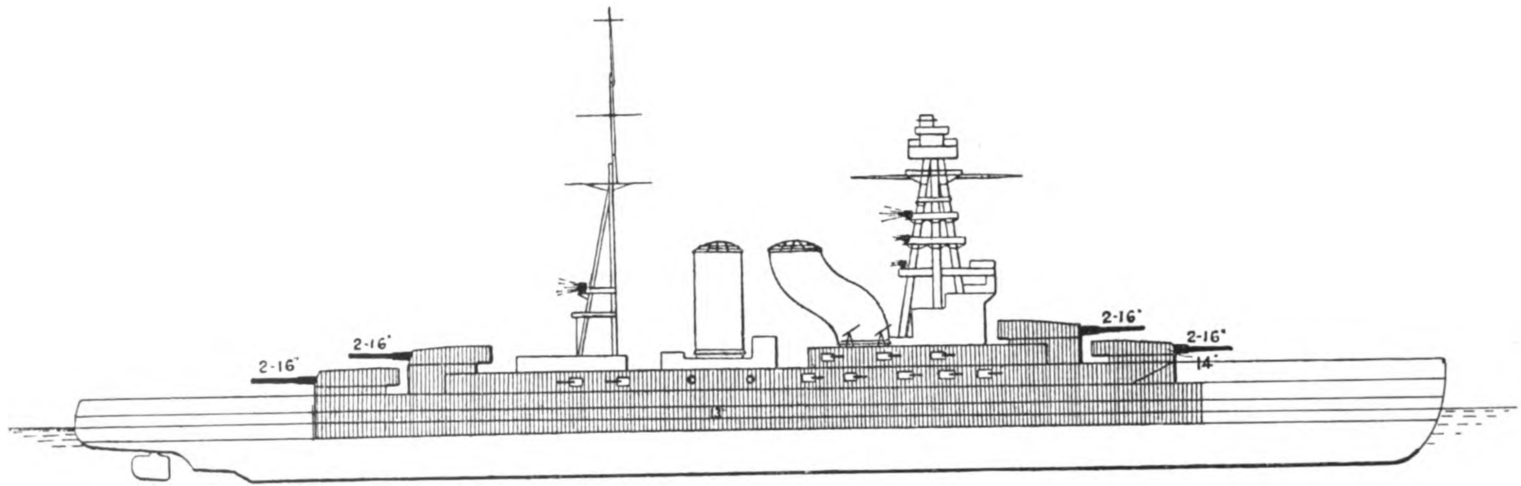


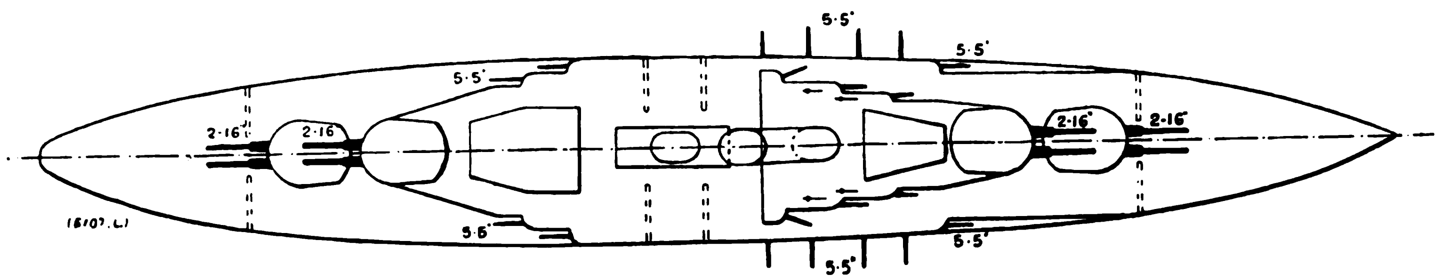
Length (extreme), 456 ft.; Speed, 27½ knots; 3,838 tons; Completed, 1914.
Armament, 7—5·9-in.; 3—3-in. A.A.; 2 submerged and 2 above-water torpedo tubes; 120 mines.

JAPAN.

BATTLESHIPS.

Nagato. **Mutsu.**



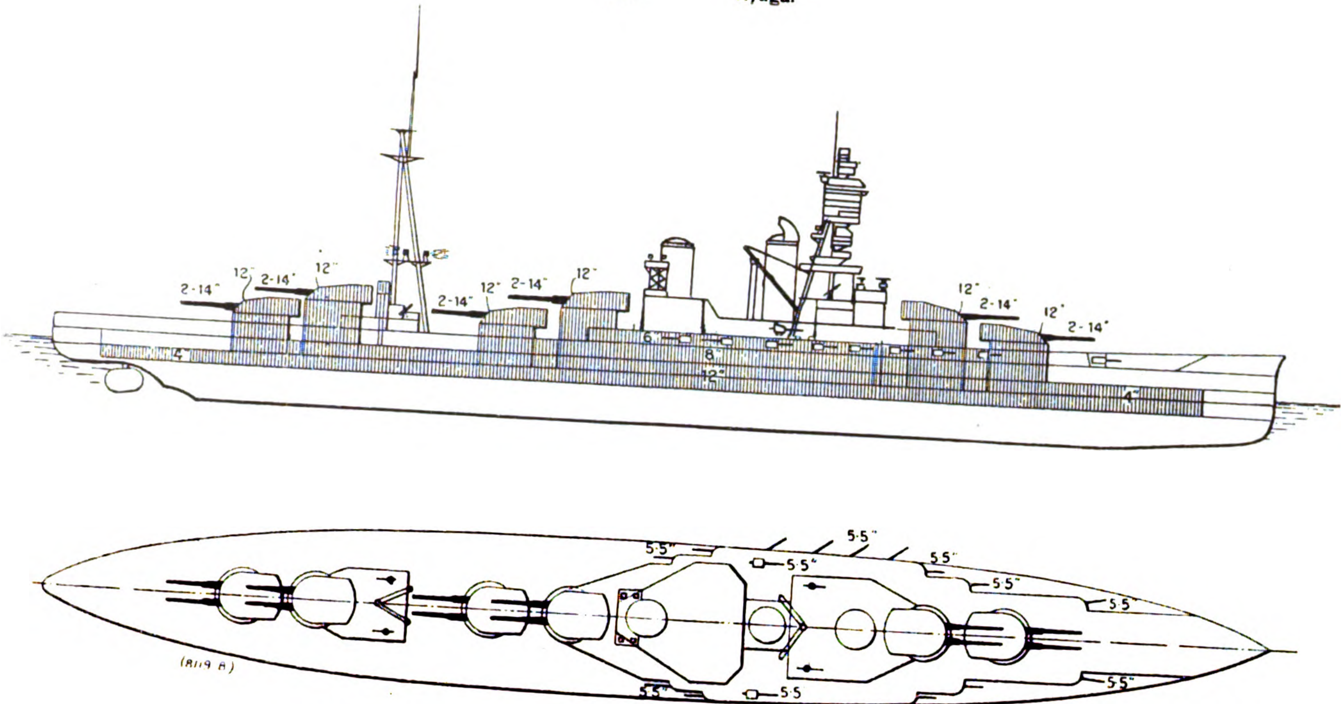


Length (extreme), 700 ft. ; Length B.P., 660 ft. 7 ins. ; Speed, 23 knots ; 32,720 tons ; Completed, 1920-1921.
Armament, 8—16-in. ; 20—5·5-in. ; 4—3-in. A.A. (Nagato, 7—3-in. A.A.) ; 4 above-water and 4 submerged 21-in. torpedo tubes.

JAPAN.

BATTLESHIPS.

Ise. **Hyuga.**

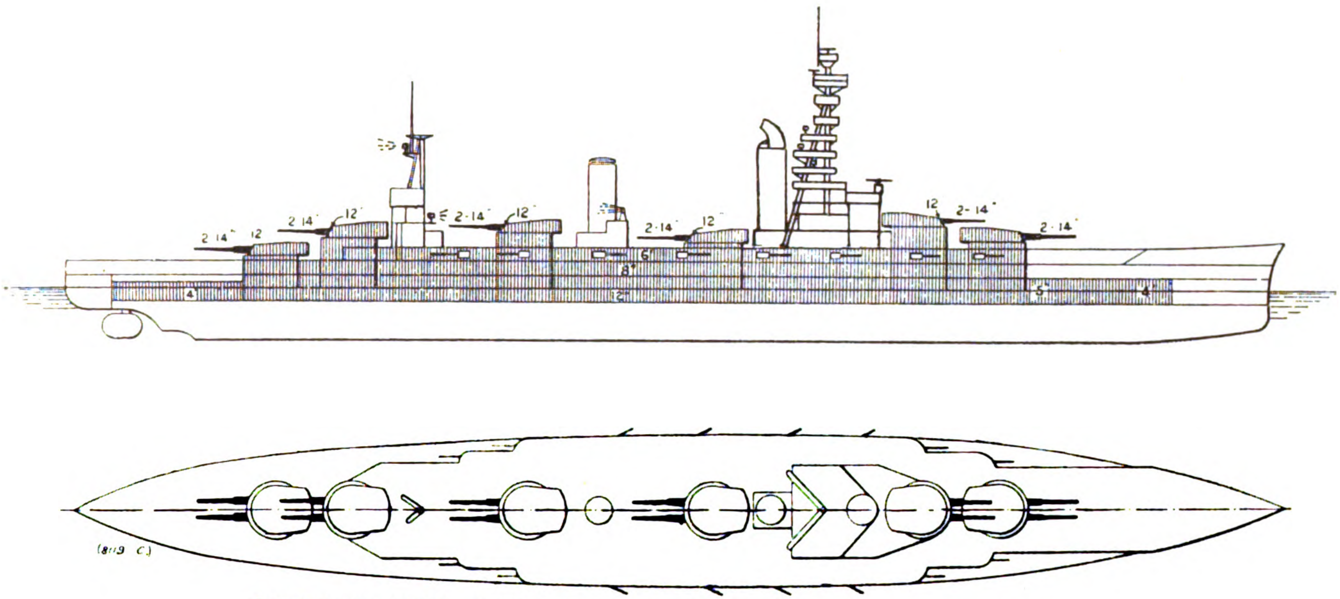


Length (extreme), 683 ft. ; Length B.P., 640 ft. ; Speed, 23 knots ; 29,990 tons ; Completed, 1917-18.
Armament, 12—14-in, ; 20—5·5-in. ; 4—3-in. A.A. 6 submerged 21-in. torpedo tubes.
2 seaplanes.

JAPAN.

BATTLESHIPS.

Fuso. Yamashiro

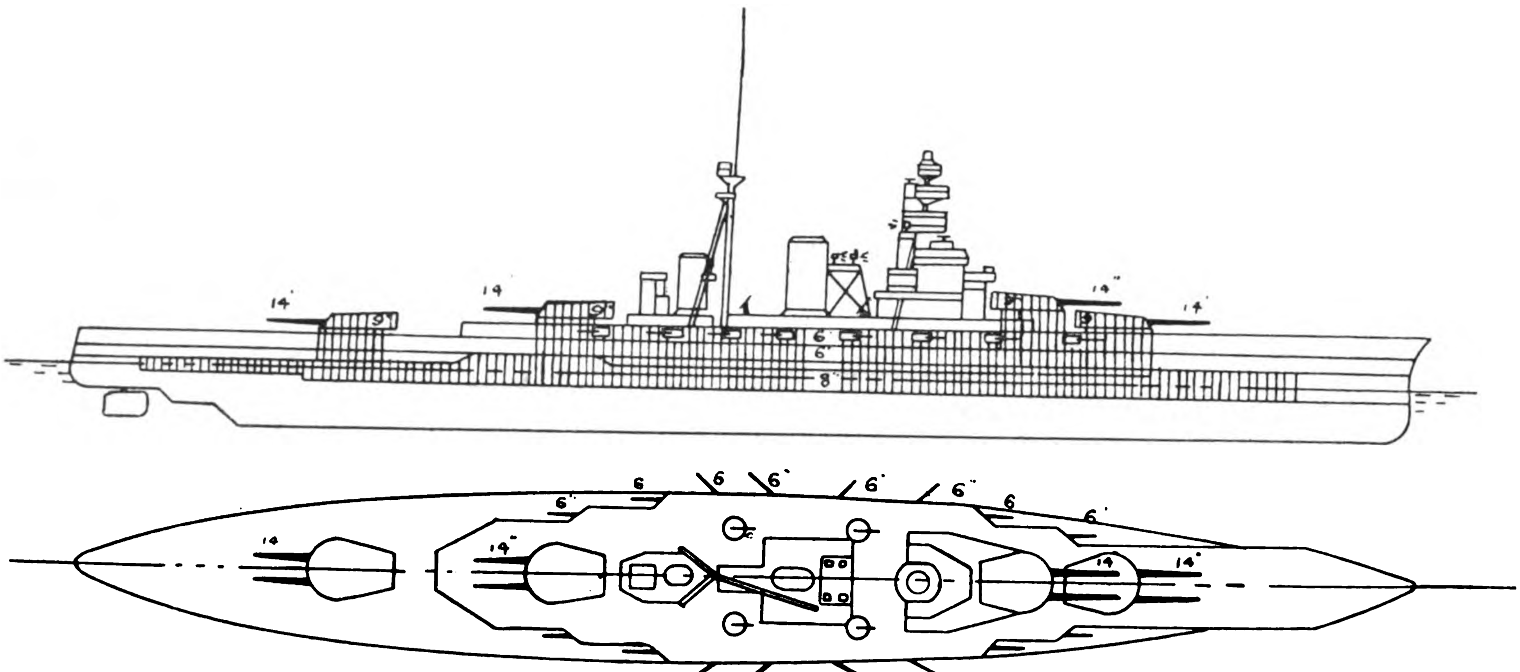


Length (extreme), 673 ft. ; Length B.P., 630 ft. ; Speed, 22·5 knots ; 29,330 tons ; Completed, 1915-17.
Armament, 12—14-in. ; 16—6-in. ; 4—3-in. A.A. ; 4 M. ; 4 L. ; 6 submerged 21-in. torpedo tubes.
2 seaplanes.

JAPAN.

BATTLE-CRUISERS.

Hiyei. Haruna. Kirishima. Kongo

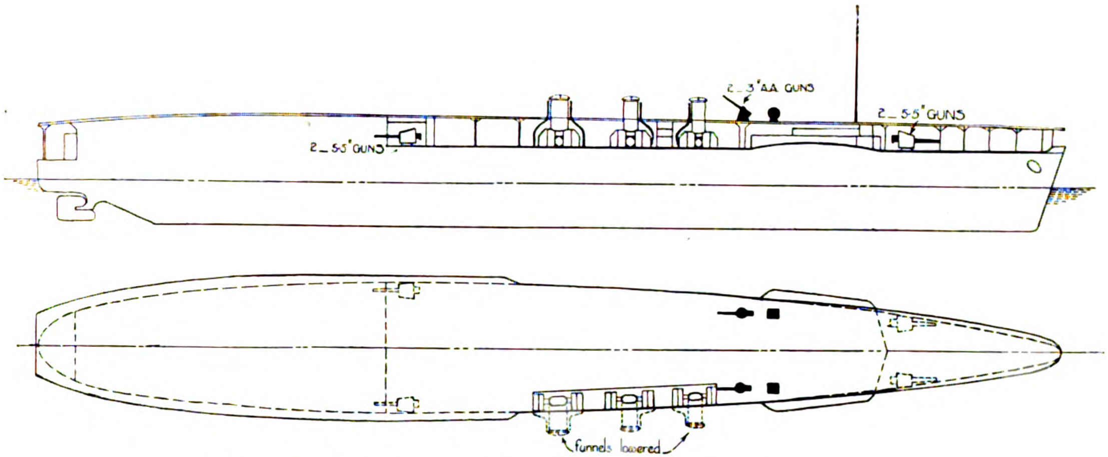


Length (extreme), 704 ft. ; Speed, 27·5 knots ; 29,330 tons ; Completed, 1914-15 ; Modernised 1928-31.
Armament, 8—14-in. ; 16—6-in. ; 4—3-in. A.A. ; 8 submerged 21-in. torpedo tubes.

JAPAN.

AIRCRAFT CARRIER.

Hosho.

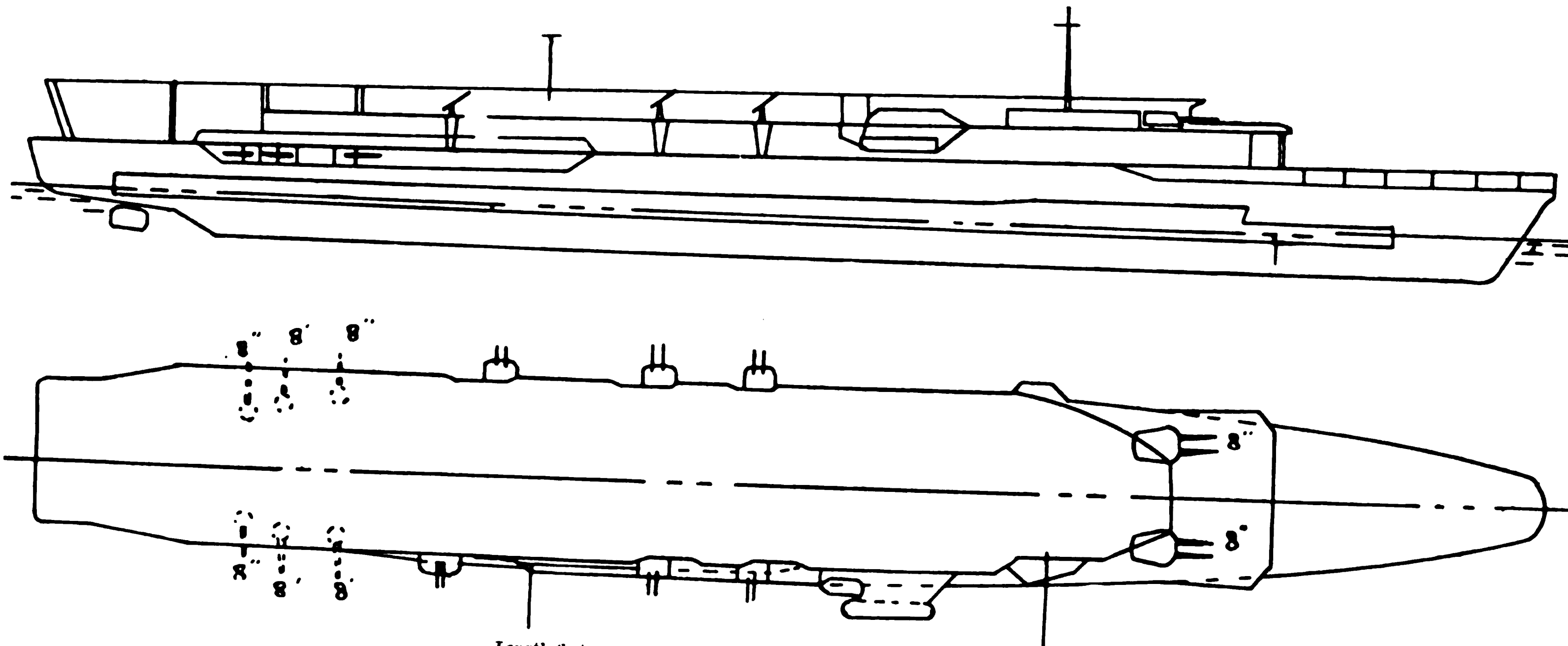


Displacement, 7,470 tons; Length B.P., 510 ft.; Speed, 25 knots; Completed, 1912.
Armament, 4—5·5-in.; 2—3-in. A.A.; Carries about 28 planes; Fitted with gyro-stabiliser.

JAPAN.

AIRCRAFT CARRIER.

Akagi.

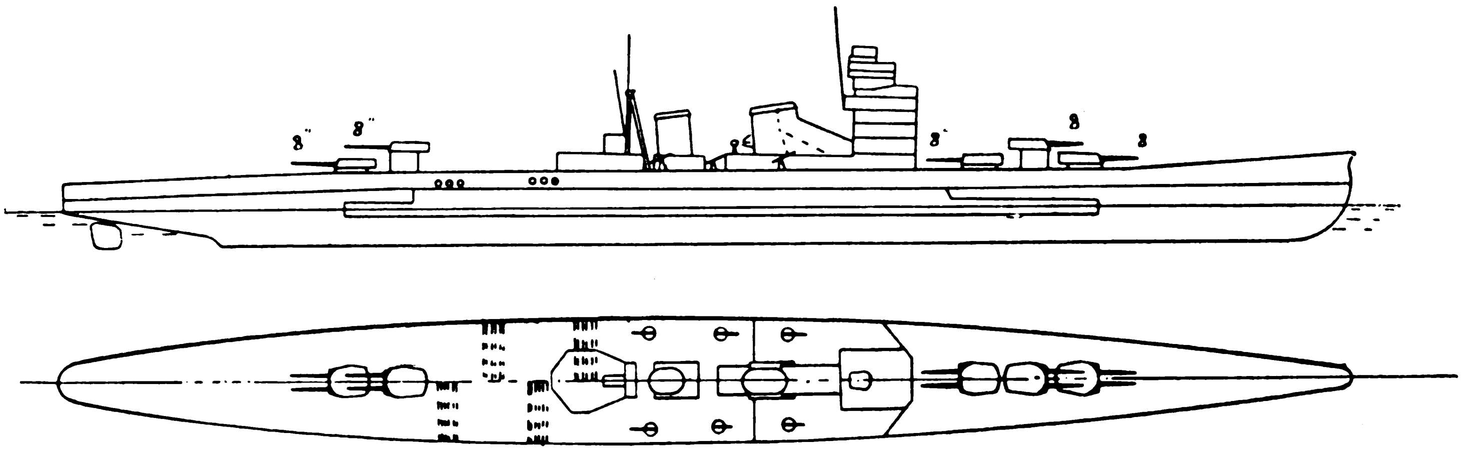


Length (between perpendiculars), 763 ft. ; 26,900 tons ; Speed, 28·5 knots.
Armament, 10—8-in. ; 12—4·7-in. A.A. Carries 66 planes.

JAPAN.

LIGHT CRUISERS.

Nachi. Myoko. Ashigara. Haguro. Atago.* Takao.* Chokai.* Maya.*



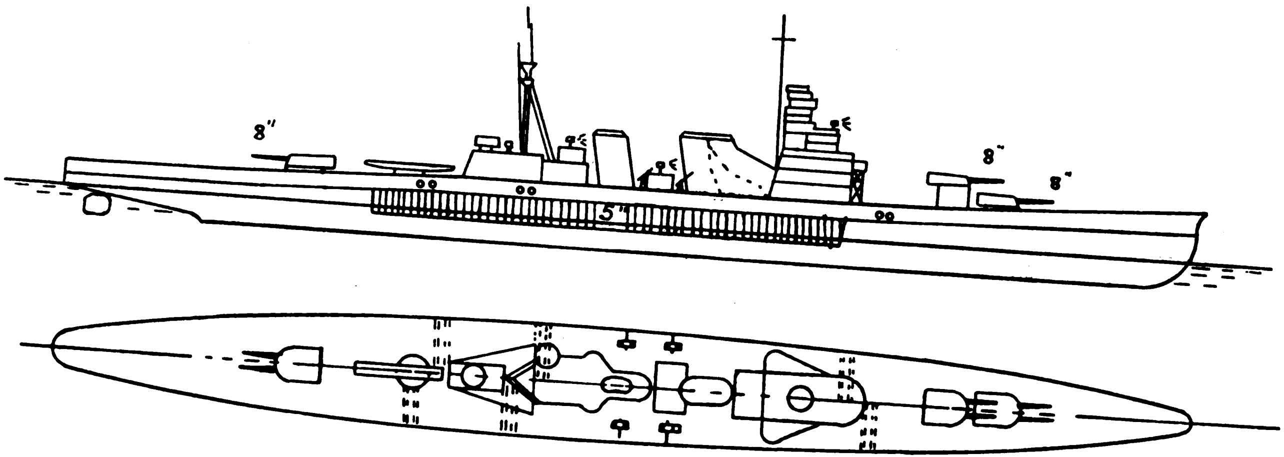
Length (between perps.), 630 ft.; 10,000 tons; speed, 33 knots.
Armament, 10—8-in.; 6—4·7-in. A.A.; 12 torpedo tubes.

* These have 4—4·7-in. A.A., and 8 torpedo tubes.

JAPAN.

CRUISERS.

Aoba. Kinugasa.

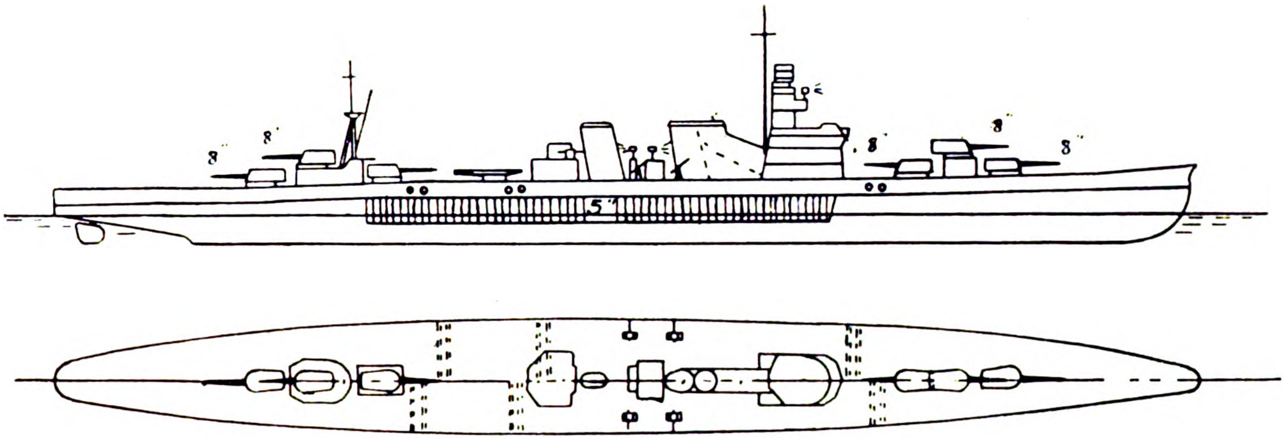


Length (extreme), 595 ft. ; 7,100 tons ; Speed, 33 knots.
Armament, 6–8-in. ; 4–4·7-in. A.A. ; 12 torpedo tubes.
1 catapult ; 2 aircraft.

JAPAN.

LIGHT CRUISERS.

Furutaka. Kako.

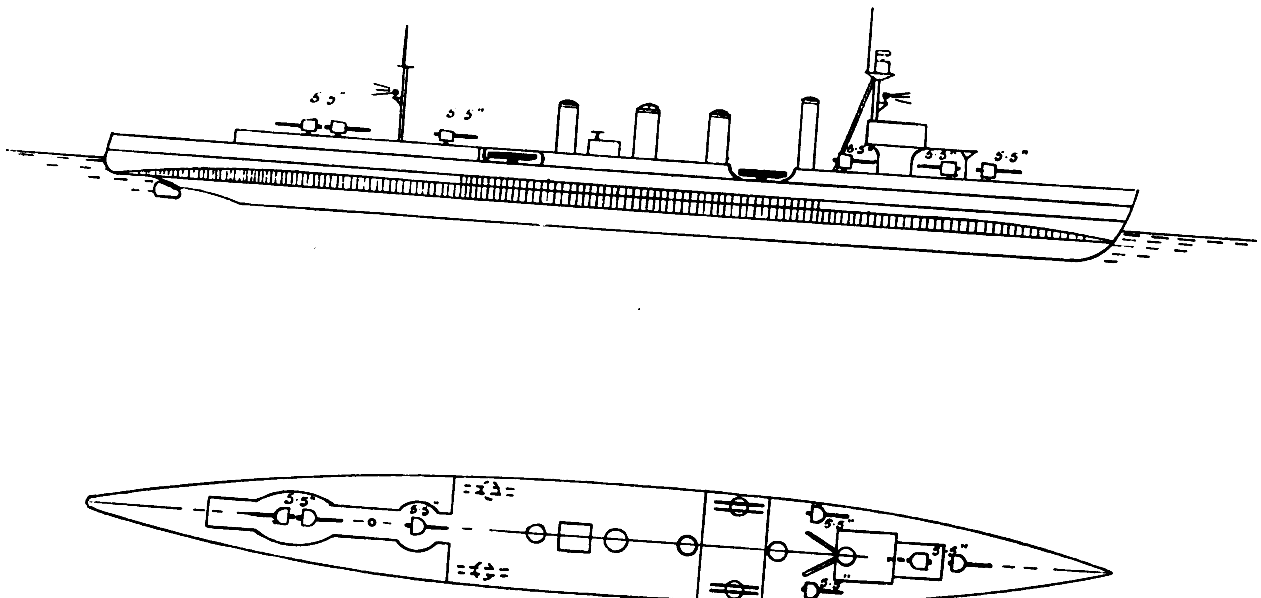


Length (extreme), 595 ft.; 7,100 tons; Speed, 33 knots.
Armament, 6—8-in.; 14—3-in. A.A.; 12 above-water torpedo tubes.
1 catapult; 2 aircraft.

JAPAN.

LIGHT CRUISERS.

Naka. Sendai. Jintsu *



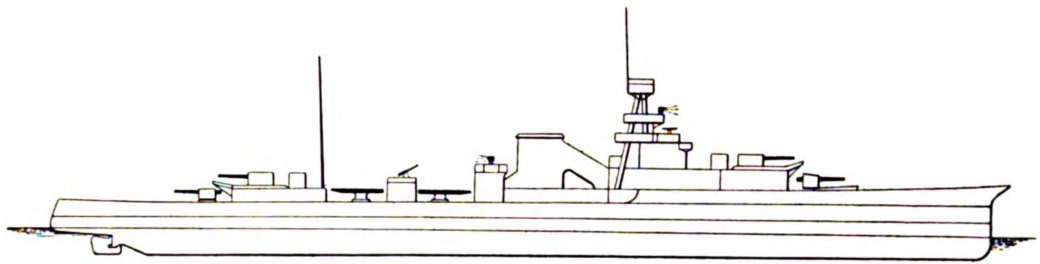
Length (extreme), 535 ft. ; Speed, 33 knots ; 5,195 tons.
Armament, 7—5·5-in. ; 2—3-in. A.A. ; 1 Pom Pom A.A. ; 4 twin torpedo tubes.
1 seaplane.

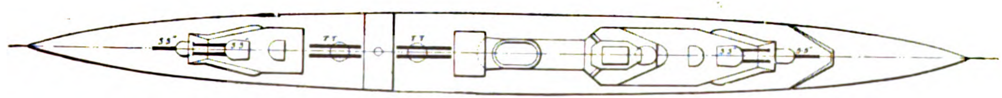
* Bow of Jintsu has been modified to give more flair.

JAPAN.

LIGHT CRUISER.

Yubari.





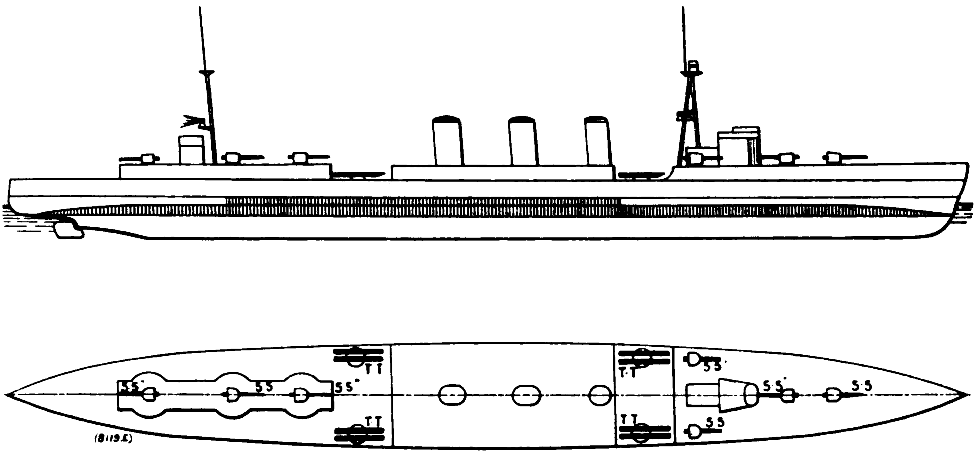
Length (extreme), 465 ft.; Length B P., 435 ft.; 2,890 tons; Speed, 33 knots. Completed, 1923.
Armament, 6 – 5·5-in.; 1—3 in. A.A.; 2 M.; 2 twin 21-in. torpedo tubes; 34 mines.

JAPAN.

LIGHT CRUISERS.

* { Isudzu. / Nagara. } * { Natori. / Yura. } *Kinu.

O-I Kiso. Kitakami Tama Kuma. *Abukuma.

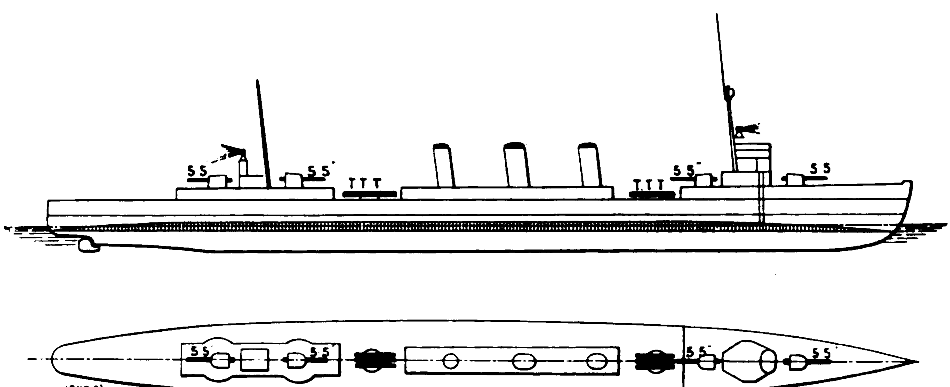


Length (extreme), 535 ft.; Length B.P, 500 ft.; Speed, 33 knots; 5,100 tons; Completed, 1920-21.
Armament, 7—5·5-in.; 2—3-in. A.A.; 4 twin above-water 21-in torpedo tubes.

* Plans apply generally to these vessels except that aircraft hangar is arranged in bridge structure. The displacement is 70 tons higher than O-I, etc. These vessels were completed, 1922-23.

LIGHT CRUISERS.

Tatsuta. Tenryu.

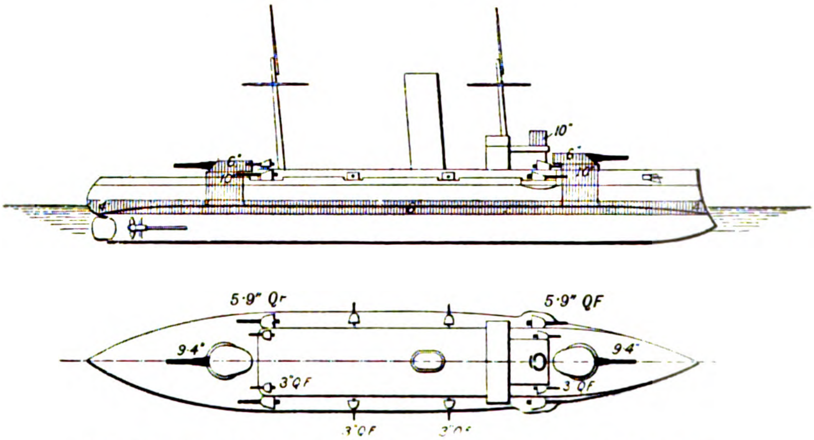


Length (extreme), 468 ft.; Speed, 31 knots; 3,230 tons; Completed, 1919.
Armament, 4—5·5-in.; 1—3-in. A.A.; 2 triple above-water torpedo tubes.
Fitted for Minelaying.

NETHERLANDS.

COAST DEFENCE SHIPS.

Hertog Hendrik. **Marten Tromp.**

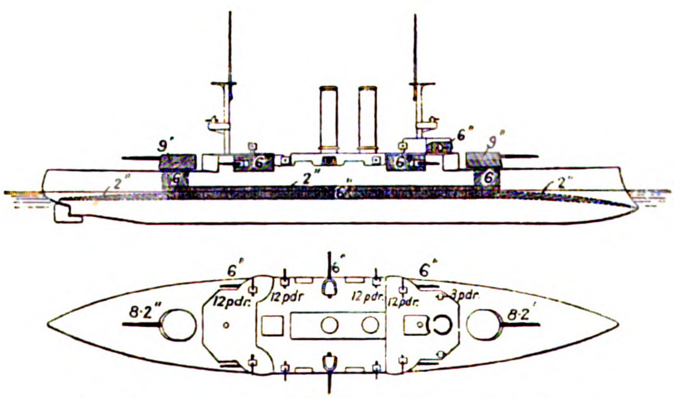


Length, 317-330 ft.; 5000—5216 tons; Speed, 16 knots; Completed, 1903—1906.
Armament: Hertog Hendrik: 2—9·4-in.; 6—5·9-in.; 4—2·9-in.; 6 small.
Marten Tromp: 2—9·4-in.; 4—5·9-in.; 8—2·9-in.; 6 small.

NORWAY.

COAST DEFENCE SHIPS

Norge. **Eidsvold**

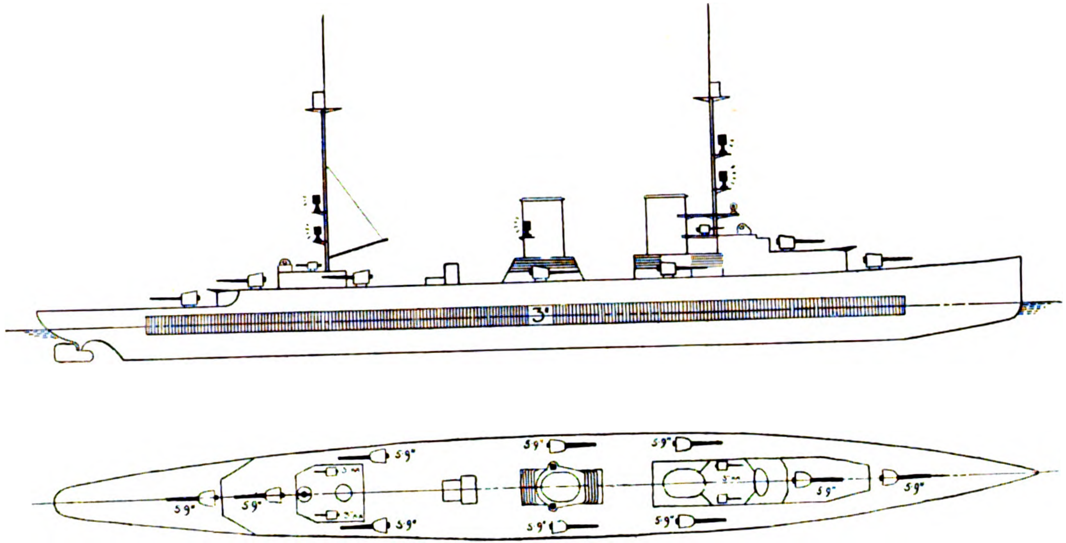


Length, 310 ft.; 4,166 tons; Speed, 16·9 knots; Completed, 1901.
Armament, 2—8·2-in.; 6—6-in.; 8—3-in.; 6—3-pr.; 2 torpedo tubes.

NETHERLANDS.

CRUISERS.

Java. **Sumatra.**

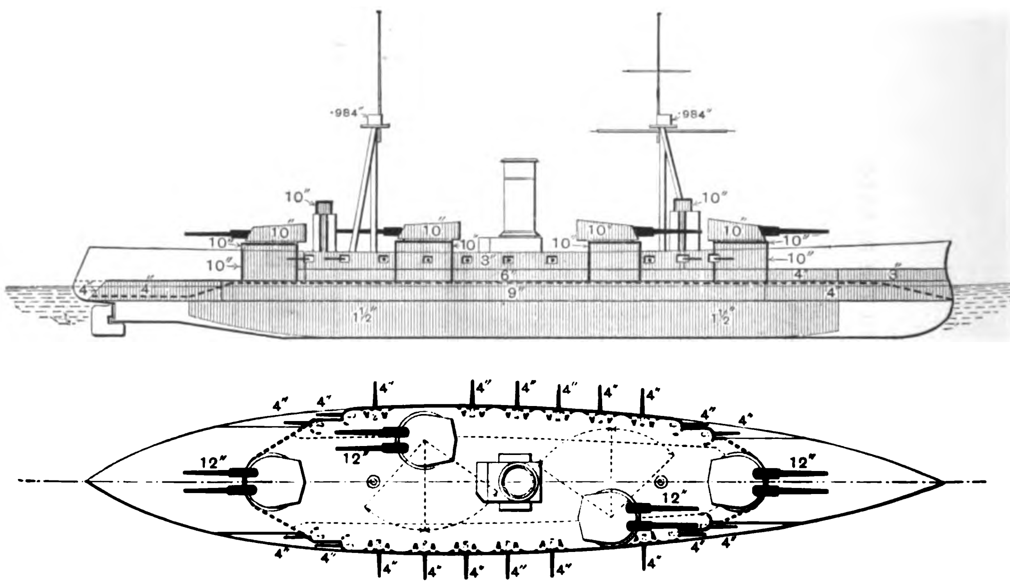


Length, 509½ ft. ; 6,930 tons ; **Speed, 30 knots.**
Armament, 10—5·9 in. ; 4—3-in. A.A. ; 8 M.

SPAIN.

BATTLESHIPS.

Espana (*ex*-Alfonso XIII). **Jaime I.**

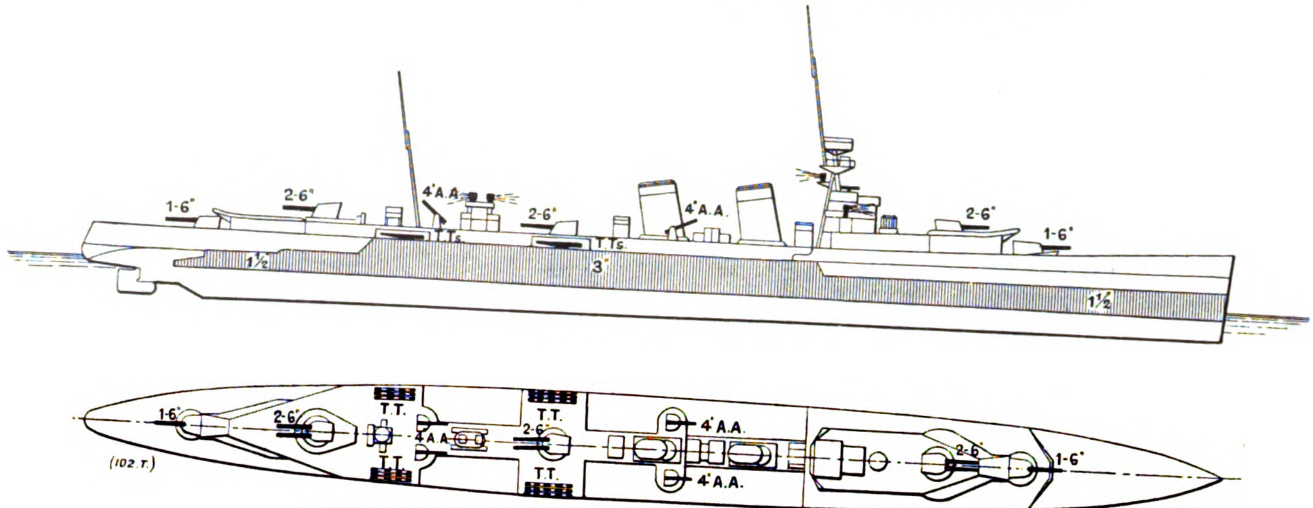


Length (extreme), 459 ft. ; Length W.L. 435 ft. ; 15,452 tons ; Speed, 19·5 knots ; Completed, 1913-1916.
Armament, 8—12-in. ; 20—4-in. ; 4—3-pr. ; 4—3 pr. A.A. ; 2 M.
(Espana, 2—3-pr. ; 2 L. ; 2 M.)

SPAIN.

LIGHT CRUISERS.

Libertad (*ex*-**Principe Alfonso**). **Almirante Cervera.** **Miguel de Cervantes.**

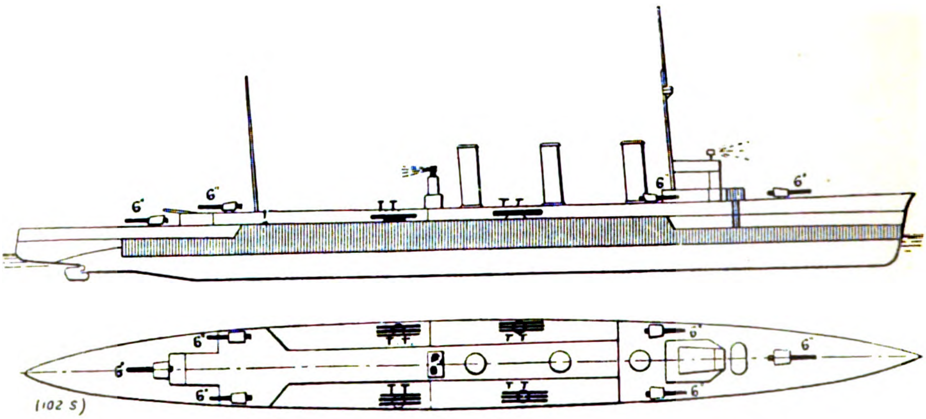


Length (extreme), 579 ft. 6 ins.; Length, B.P., 545 ft.; 7,850 tons; Speed, 33 knots.
Armament, 8–6-in.; 4–4-in. A.A., 2–3 pr., 4 triple above-water torpedo tubes (21-in. torpedoes).
The mainmast is tripod.

SPAIN.

LIGHT CRUISERS.

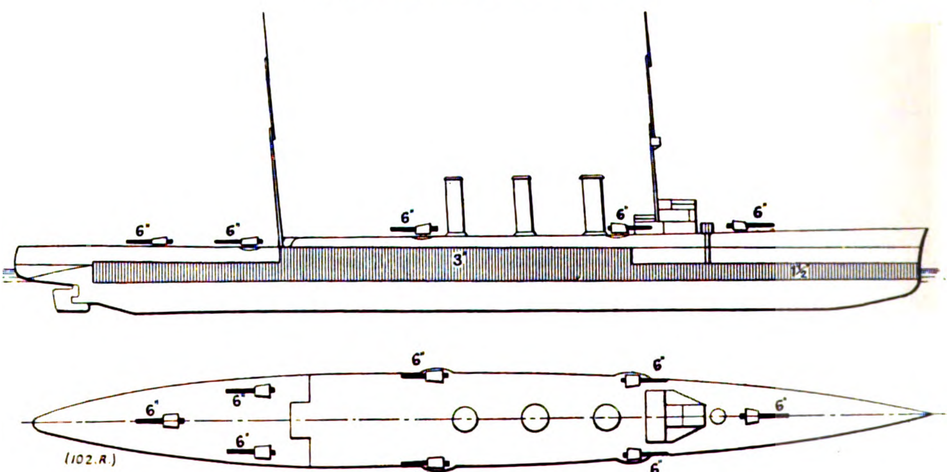
Blas de Lezo. **Mendez Nuñez.**



Length (extreme), 462 ft. ; Length B.P., 439 ft. ; 4,650 tons ; Speed, 29 knots. Completed, 1924.
Armament, 6—6-in. ; 4—3-pr. A.A. ; 4 M. ; 4 above-water triple torpedo tubes (21-in. torpedoes).

LIGHT CRUISER.

Republica (*ex*-**Reina Victoria Eugenia**).



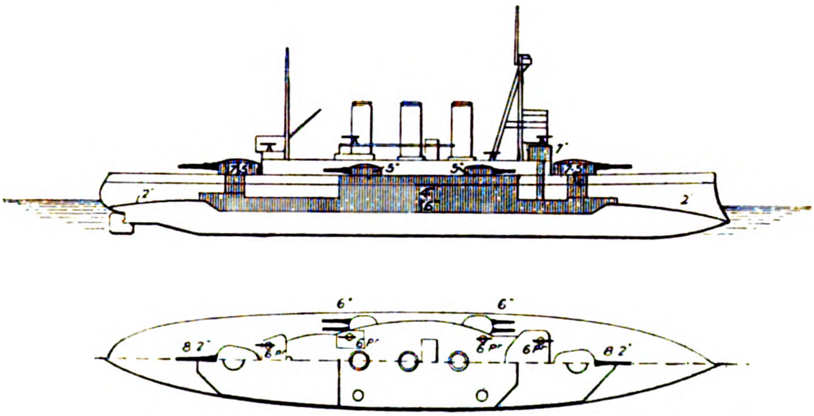
Length (extreme), 462 ft. ; 6,130 tons ; Speed, 25¼ knots ; Completed, 1922.
Armament, 9*—6-in. ; 1—3-in. ; 4—3-pr. A.A. ; 4 M. ; 1 L. ; 4 torpedo tubes.

* NOTE.—There should be two 6-in. guns abreast forward instead of one on the centre line as shown.

SWEDEN.

BATTLESHIP.

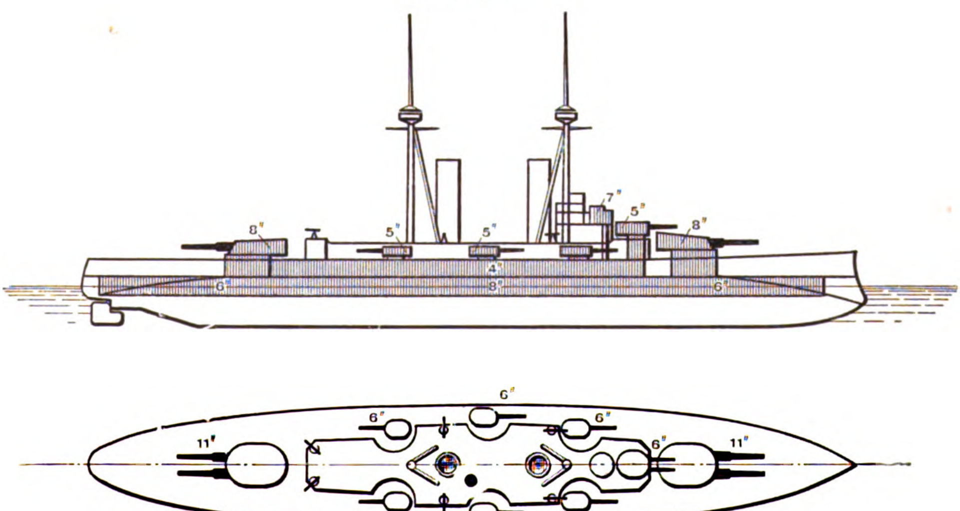
Oscar II.



Length. 313·6 ft. ; 4,584 tons ; Speed, 18 knots ; Completed, 1907.
Armament, 2—8·2-in. ; 8—6-in. ; 8—6-pr. ; 1—1-pr. ; 2 torpedo tubes.

ARMOURED CRUISERS.

*Drottning Victoria.



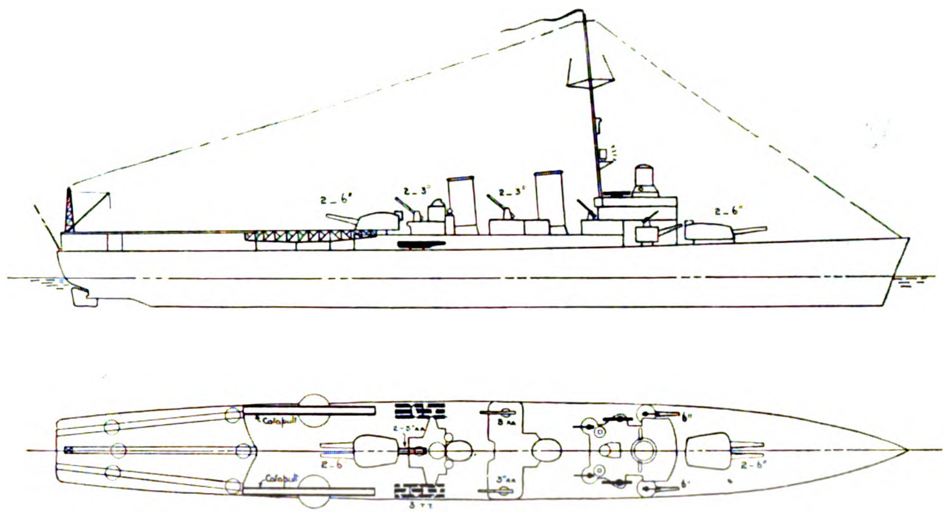
Length, 396·7 ft. ; 7,500 tons ; Speed, 22 knots ; Completed, 1917-1922.
Armament, 4—11-in. ; 8—6-in. ; 6—3-in. ; 2—6-pr. ; 2 M.

* To be reconstructed and modernised as Gustav V and Sverige (see P93).

SWEDEN.

AIRCRAFT CRUISER.

Gotland.

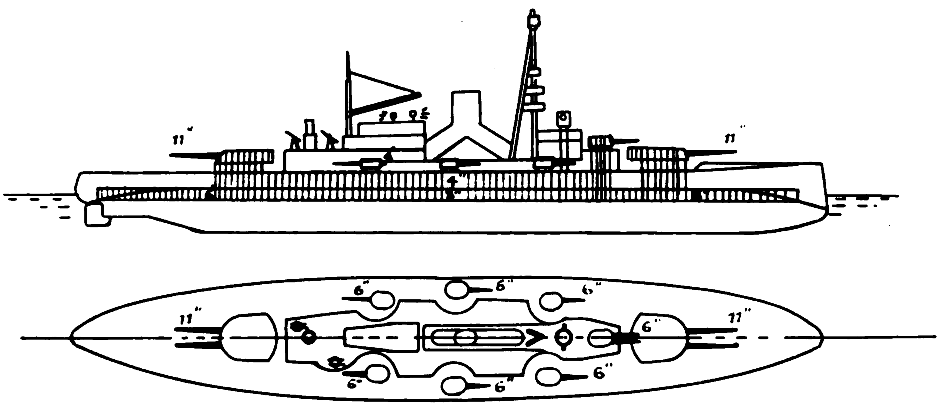


Length, 442 ft. ; 33,000 tons ; Speed, 27 knots.
Armament, 6–6-in. ; 4–3-in. A.A. ; 4 M. ; 6–21-in. torpedo tubes.
2 catapults.

SWEDEN.

ARMOURED CRUISERS.

Gustav V. **Sverige.**



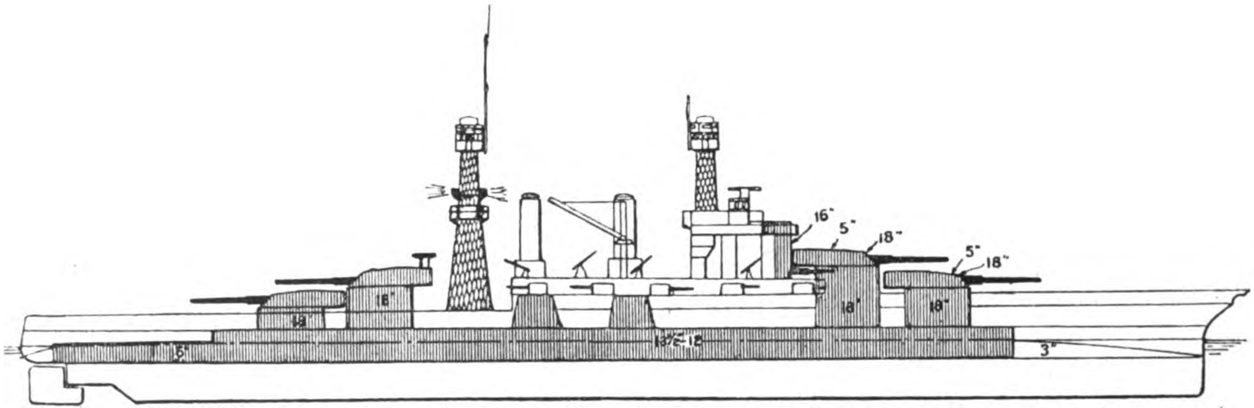
Length, 396·7 ft. ; Gustav, 7,500 tons ; Sverige, 6,990 tons ; Speed, 22 knots ; Completed, 1917–1921. Reconstructed 1924–29.

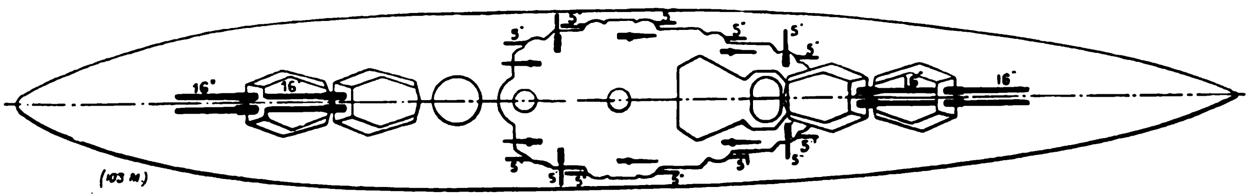
Armament, 4—11-in. ; 8—6-in. ; 6—3-in. ; 2–6-pr. ; 2 M.

UNITED STATES.

BATTLESHIPS.

Colorado. Maryland. West Virginia





Length (extreme), 624 ft. ; Length W.L., 600 ft. ; Speed, 21 knots ; 32,600 tons ; Maryland, completed, 1921 ; Colorado and West Virginia, completed, 1923.

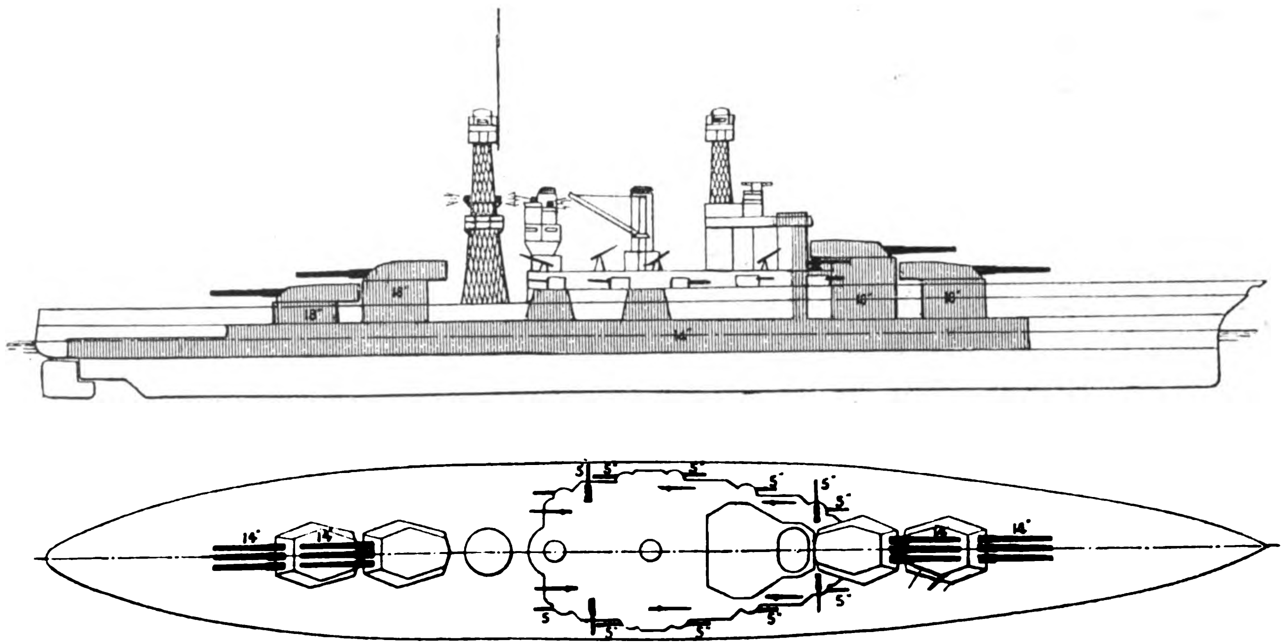
Armament, 8—16-in. ; 12—5-in. ; 8—5-in. A.A. ; 4—6-pr. ; 2 submerged 21-in. torpedo tubes.

Catapult mounted right aft on Quarter Deck ; 3 aircraft.

UNITED STATES.

BATTLESHIPS.

California. **Tennessee**



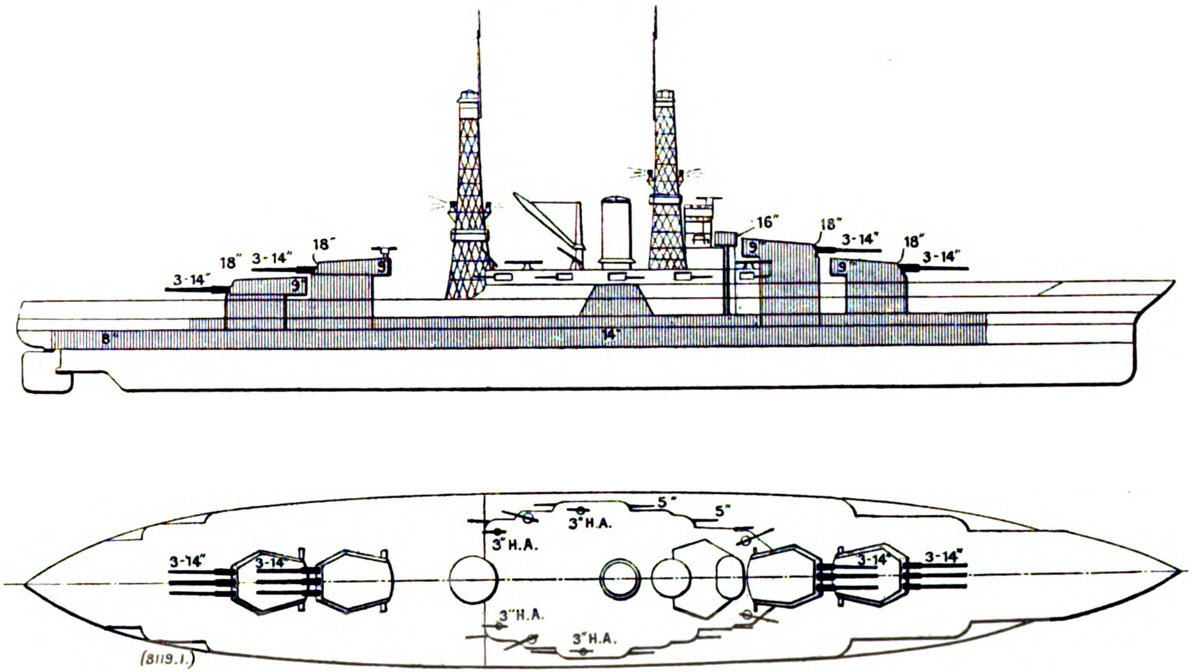
Length (extreme), 624 ft.; Length W.L., 600 ft.; Speed, 21 knots; 32,300 tons; Completed, 1920-21.
Armament, 12—14-in.; 12—5-in.; 8—5-in. A.A.; 4—6-pr.; 2—1-pr.; 2 submerged 21-in. torpedo tubes.
2 catapults (one right aft on Quarter Deck); 3 seaplanes.

UNITED STATES.

BATTLESHIPS.

Idaho. **New Mexico.** **Mississippi.**

(All being modernised.)



Length (extreme), 624 ft. Length W.L., 600 ft.; Speed, 21 knots; 32,000 tons; Completed, 1917-19.
Armament, 12—14-in.; 12—5-in.; 8—3-in. A.A.; *4—6-pr.; 2 submerged 21-in. torpedo tubes.

* Idaho, 4—3-pr.

Catapult mounted right aft on Quarter Deck; 3 aircraft.

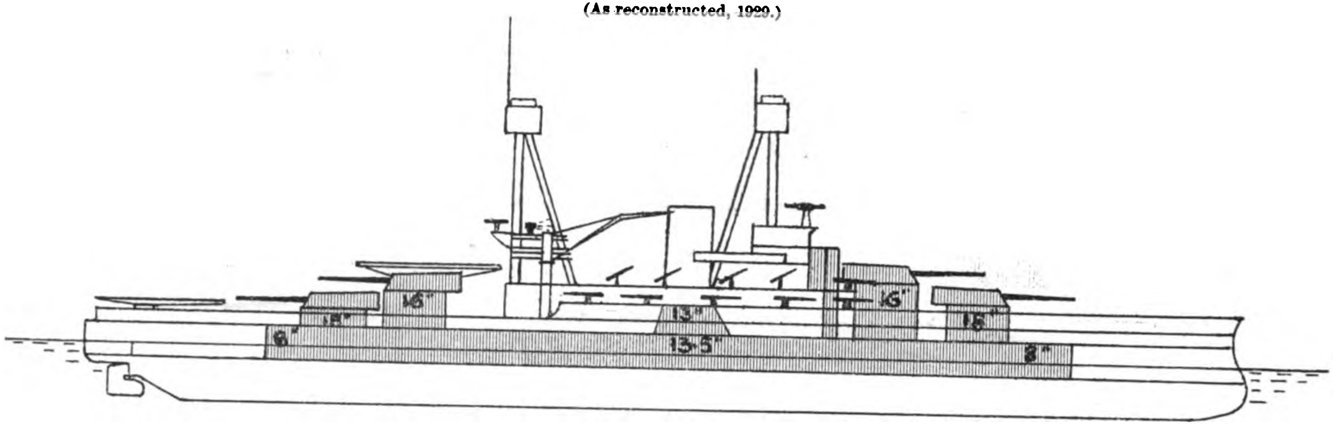
Mississippi has an additional turret catapult.

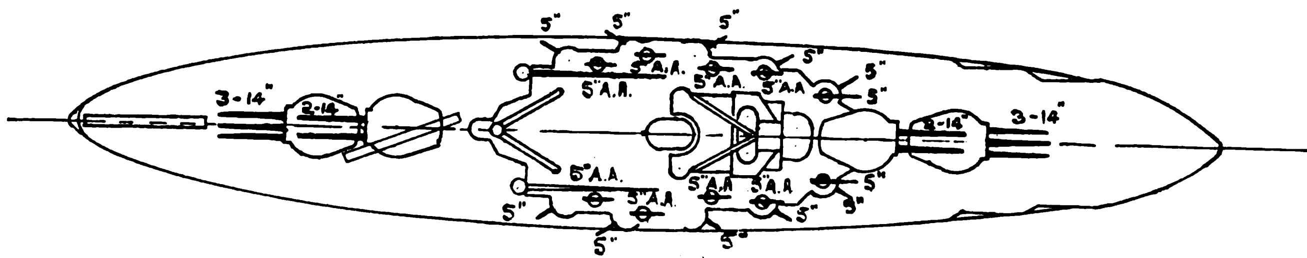
UNITED STATES.

BATTLESHIPS.

Nevada. **Oklahoma.**

(As reconstructed, 1929.)





Length (extreme), 583 ft. ; Length W.L., 575 ft. ; Speed, 20·5 knots ; 27,500 tons.

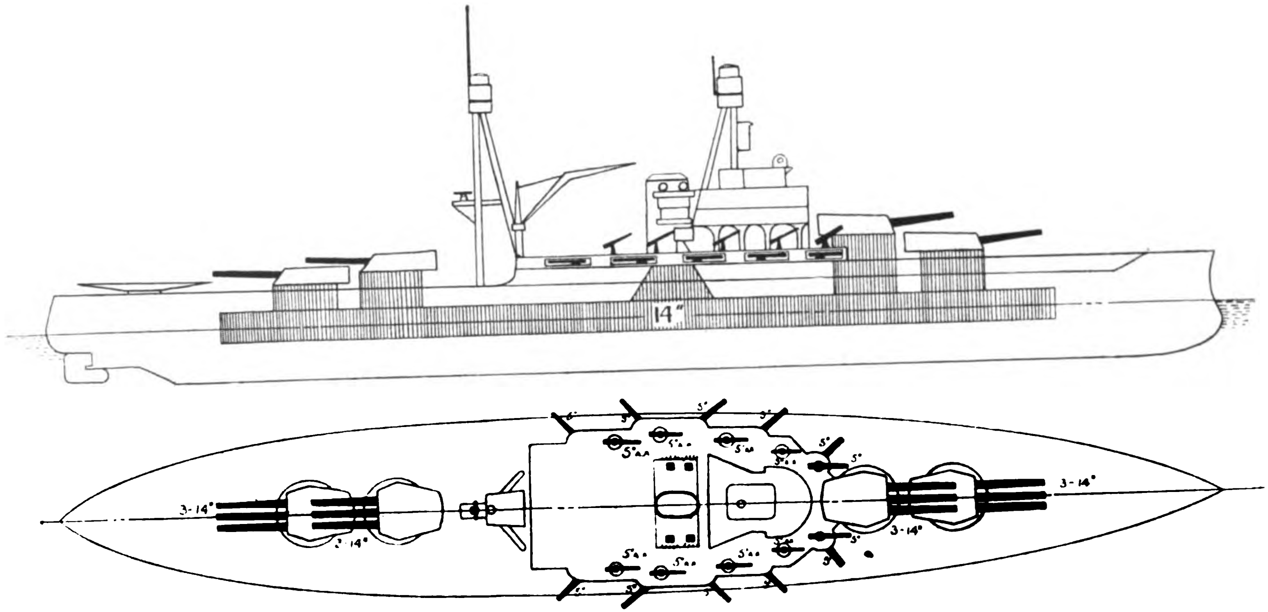
Armament, 10—14-in. ; 12—5-in. ; 8—5-in. A.A. ; 4—6-pr. (Oklahoma, 4—3-pr.) ; 2—1-pr. ; 2 M. ; 2 L. ; 1 catapult ; 3 aeroplanes.

UNITED STATES.

BATTLESHIPS.

Arizona. **Pennsylvania.**

(As reconstructed 1931.)



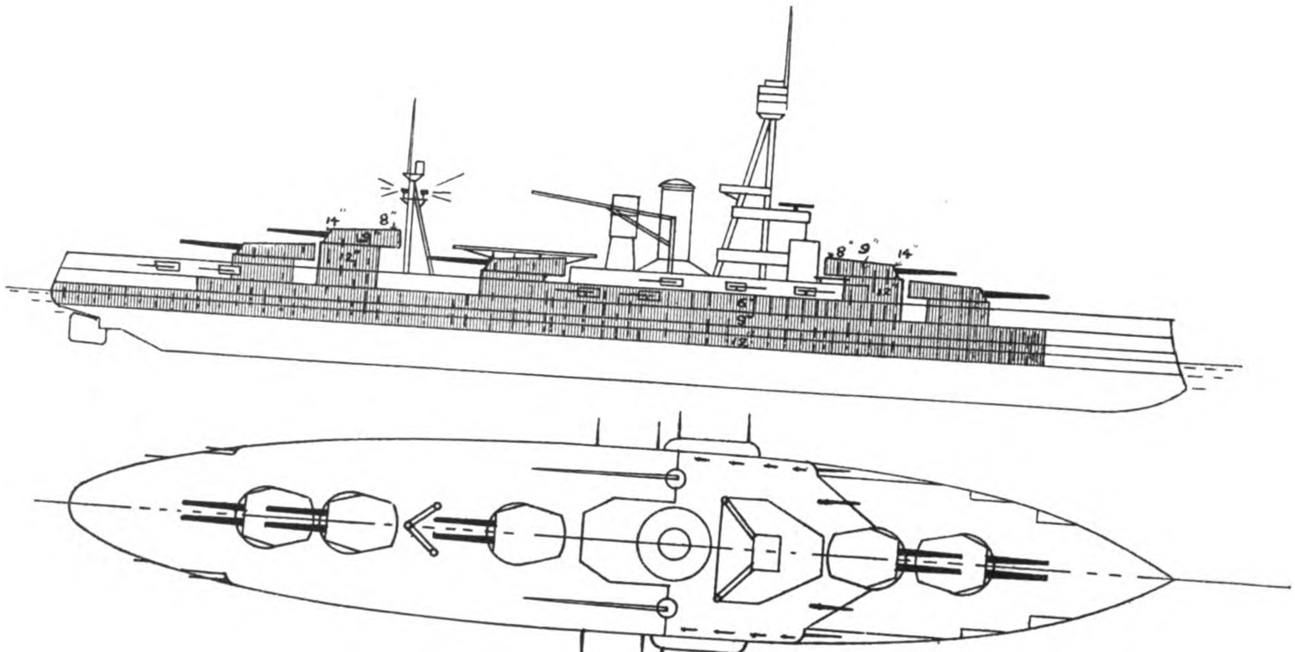
Length (extreme), 608 ft.; Length B.P., 596 ft.; Speed, 21 knots; 31,400 tons; Completed, 1916.
Armament, 12—14-in.; 12—5-in.; 8—5-in. A.A.; 4—3-pr.; 2—1-pr.; 2 M.; 2 L.

UNITED STATES.

BATTLESHIPS.

New York. **Texas.**

(As reconstructed 1927.)



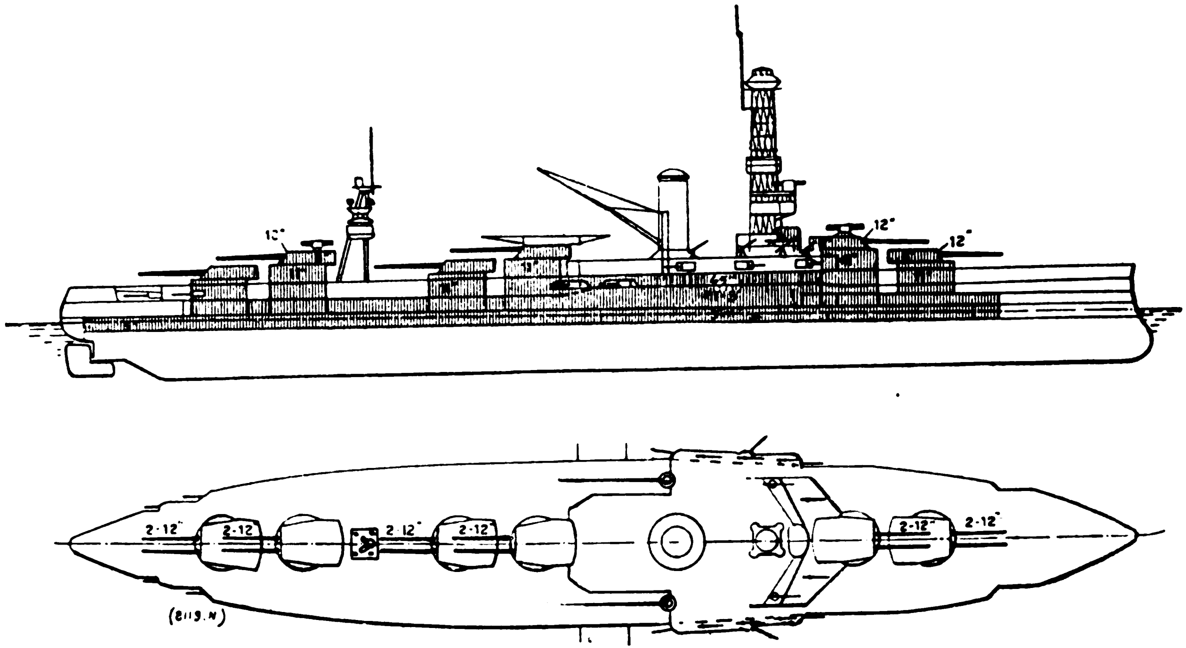
Length (extreme), 573 ft.; Length W.L., 565 ft.; **Speed, 21 knots; 28,700 tons; Completed, 1914.**
Armament, 10—14-in.; 16—5. in.; 8—3-in. A.A.; 4—3-pr.; 2—1-pr.; 2 M.; 1 catapult; 3 aircraft.

UNITED STATES.

BATTLESHIP.

Arkansas.

(As reconstructed 1927.)

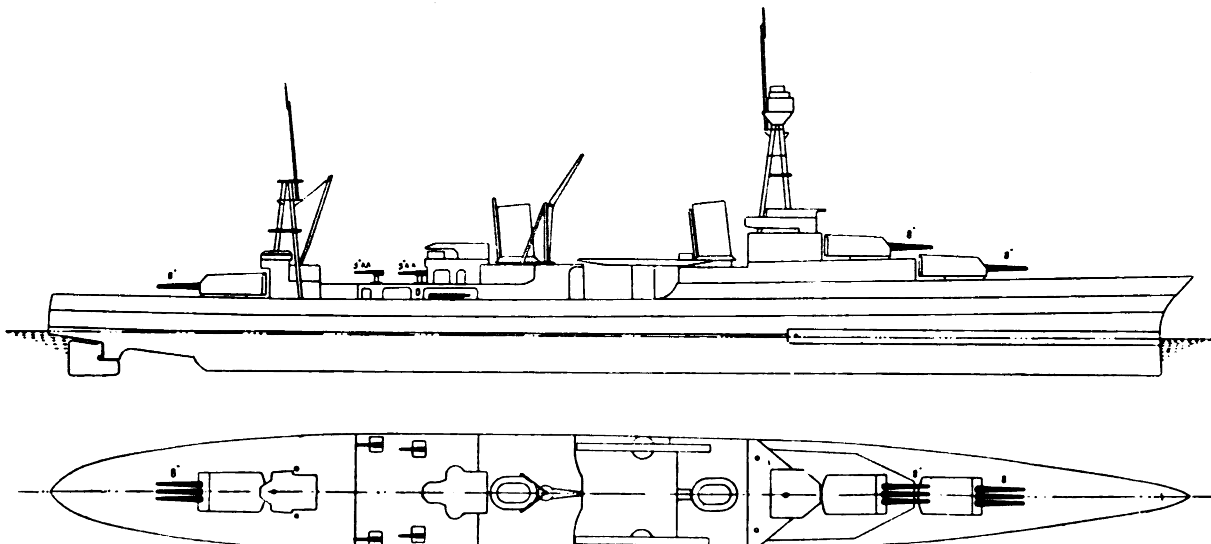


Length (extreme), 562 ft.; Length W.L., 554 ft.; Speed, 20·5 knots; 27,900 tons; Completed, 1912. Armament, 12—12-in.; 16—5-in.; 8—3-in. A.A.; 4—3-pr.; 2—1-pr.; 2 M.; 1 catapult; 3 aircraft.

UNITED STATES.

CRUISERS.

Northampton. Chester. Louisville. Chicago. Houston. Augusta.

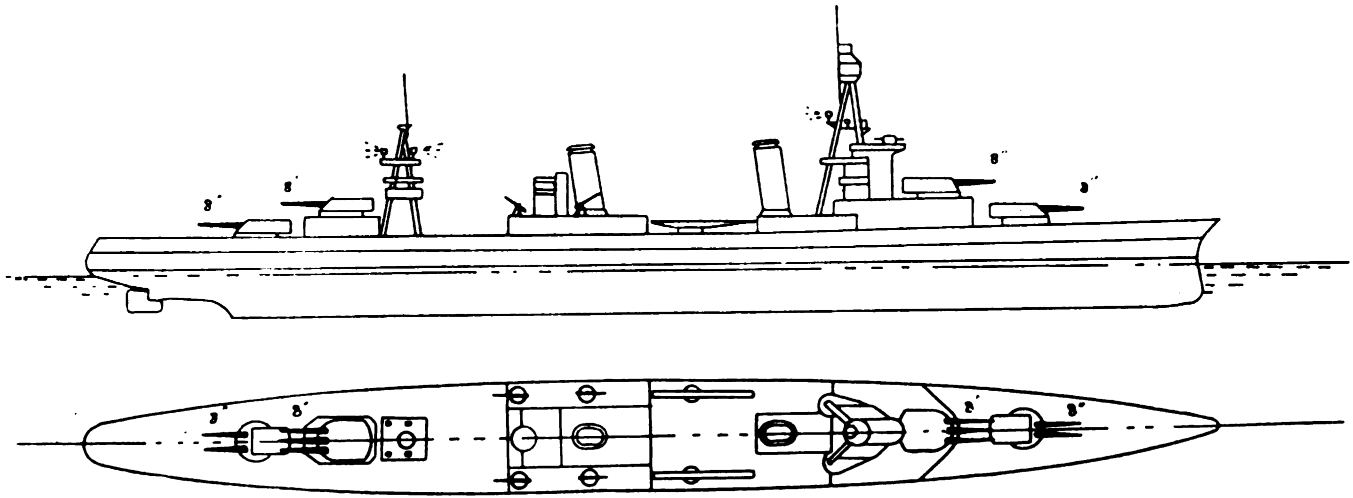


Length (extreme), 600 ft.; 10,000 tons; Speed, 32·7 knots.
Armament, 9—8-in.; 4—5-in. A.A.; 2 catapults; 4 to 6 seaplanes.

UNITED STATES.

CRUISERS.

Salt Lake City. Pensacola.

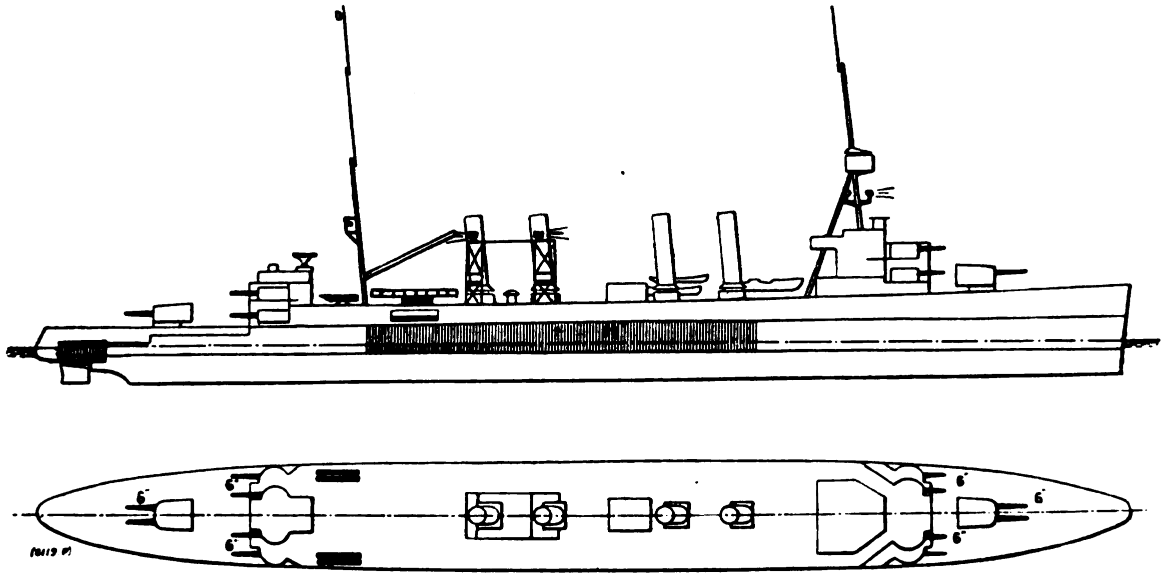


Length (extreme), 585½ ft. ; 10,000 tons ; Speed, 32½ knots.
Armament, 10—8-in. ; 4—5-in. A.A. ; 2—3-pr. ; 2 triple torpedo tubes.
2 catapults ; 4 seaplanes.

UNITED STATES.

SCOUT CRUISERS.

Cincinnati. Concord. Detroit Raleigh. Marblehead. Richmond. Memphis. Trenton. Milwaukee. Omaha.

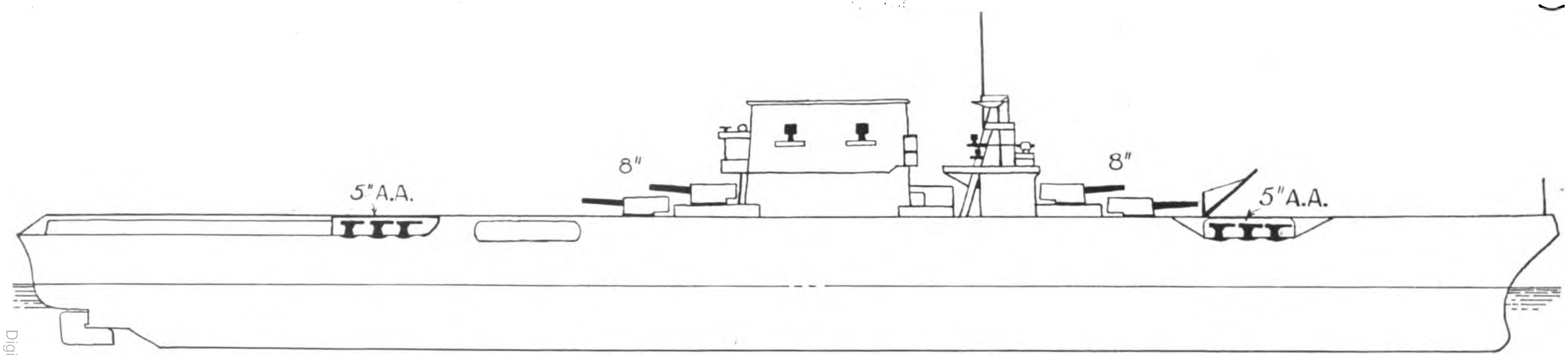


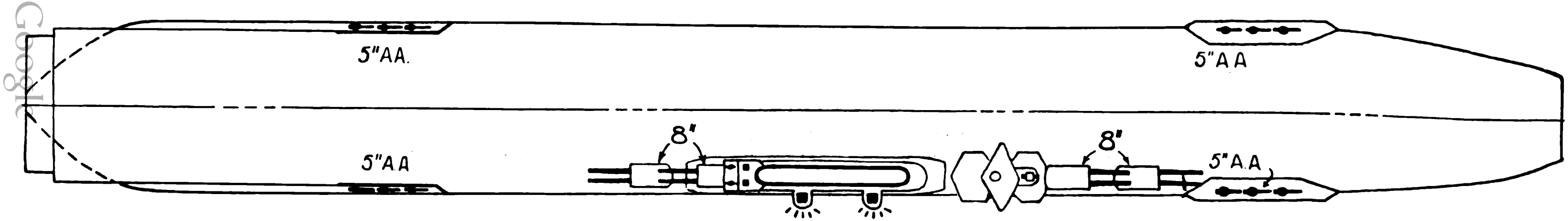
Length (extreme), 555 ft. 6 ins.; Length W.L., 550 ft.; Speed, 33·7 knots; 7,050 tons. Completed in 1923-25.
Armament, 12—6-in.; 4–3-in. A.A.; 2—3-pr.; 2 triple above-water 21-in. torpedo tubes.
2 catapults; 3 aeroplanes.

UNITED STATES.

AIRCRAFT CARRIERS.

Lexington. **Saratoga.**

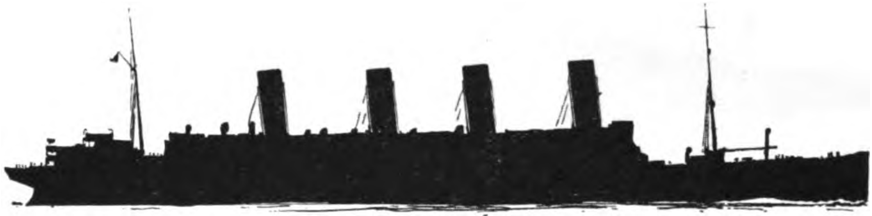




Length (extreme), Lexington, 830 ft. ; Saratoga, 888 ft. ; 33,000 tons ; Speed, 33¼ knots.
Armament, 8—8-in. ; 12—5-in. A.A. ; 4—6-pr. ; 70 to 80 aircraft.

PROFILES OF MERCHANT SHIPS.

MERCHANT SHIPS.



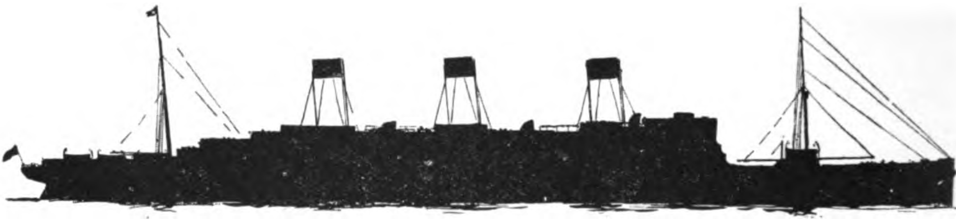
AQUITANIA. Cunard. Length, 868 ft. 7 ins. ; Gross Tonnage, 45,647 ;
Funnels : Red, Black Tops.

OLYMPIC. White Star. Length, 852 ft. 5 ins. ; Gross Tonnage, 46,439 ;
Funnels : Buff, Black Tops.

MAURETANIA. Cunard. Length, 762 ft. 2 ins. ; Gross Tonnage, 30,696 ;
Funnels : Red, Black Tops.

FRANCE. Cie. Générale Transatlantique. Length, 690 ft. 1 in. ; Gross Tonnage, 23,769 ;
Funnels : Red, Black Tops.

ARUNDEL CASTLE. WINDSOR CASTLE. Union Castle. Length, 630 ft. 5 ins. and 632 ft. 4 ins. ;
Gross Tonnage, 19,023 and 18,967 ;
Funnels : Red, Black Tops.

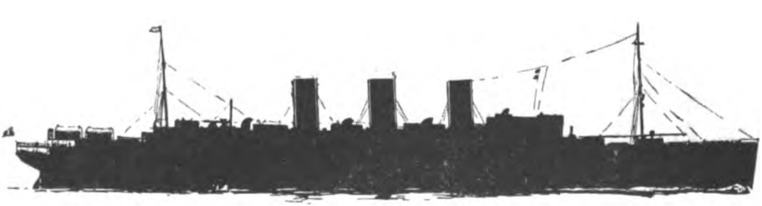


MAJESTIC. White Star. Length, 915 ft. 5 ins.; Gross Tonnage, 56,621; Funnels: Buff, Black Tops.

LEVIATHAN. United States Lines. Length, 907 ft. 6 ins.; Gross Tonnage, 48,591; Funnels: Red, White Band, Blue Tops.

BERENGARIA. Cunard. Length, 883 ft. 6 ins.; Gross Tonnage, 52,226; Funnels: Red, Black Tops.

ILE DE FRANCE. Cie. Générale Transatlantique. Length, 763 ft. 7 ins.; Gross Tonnage, 43,153; Funnels: Red, Black Tops.



PARIS. Cie. Générale Transatlantique. Length, 735 ft. 4 ins.; Gross Tonnage, 34,569; Funnels: Red, Black Tops.

EMPRESS OF BRITAIN. Canadian Pacific. Length, 733 ft. 3 ins.; Gross Tonnage, 42,348; Funnels: Yellow.

L'ATLANTIQUE. Cie. Sud Atlantique. Length, 713 ft. 6 ins.; Gross Tonnage. 40,945; Funnels: Buff, Black Tops.

BELGENLAND. Red Star. Length, 670 ft. 4 ins.; Gross Tonnage, 27,132; Funnels: Black, White Band.

STATENDAM. Holland-Amerika. Length, 670 ft. 4 ins.; Gross Tonnage, 29,511; Funnels: Buff, White Band between Two Green.

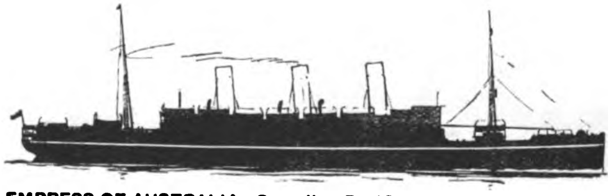
EMPRESS OF JAPAN. Canadian Pacific. Length, 644 ft.; Gross Tonnage, 26,032; Funnels, Buff.

STRATHNAVER. STRATHAIRD. Peninsular and Oriental.
Length, 638 ft.; Gross Tonnage, 22,547;
Funnels: Yellow. Hulls: White.

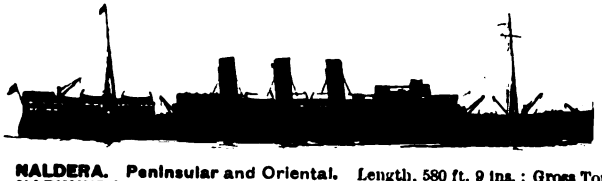
CAP POLONIO. Hamburg-South Amerika. Length, 637 ft. 8 ins.; Gross Tonnage, 20,011;
Funnels: White, Red Tops.

EMPRESS OF CANADA. Canadian Pacific. Length, 627 ft.; Gross Tonnage, 21,517;
Funnels: Yellow.

RELIANCE. RESOLUTE. Hamburg-Amerika Line. Length, 590 ft. 4 ins.;
Gross Tonnage, 19,521 and 19,464;
Funnels: Yellow, with Black, White and Red Bands at Top.

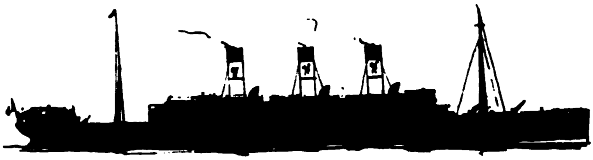


EMPRESS OF AUSTRALIA. Canadian Pacific. Length, 589 ft. 9 ins.; Gross Tonnage, 21,833;
Funnels: Yellow.



NALDERA. Peninsular and Oriental. Length, 580 ft. 9 ins.; Gross Tonnage, 16,088;
NARKUNDA. " " " Length, 581 ft. 4 ins.; Gross Tonnage, 16,572;
Funnels: Black.

(The Narkunda is similar to the Naldera but has raised forecastle.)



LUTETIA. Cie. Sud Atlantique. Length, 579 ft.; Gross Tonnage, 14,783;
Funnels: Buff, Black Tops.

MASSILIA. Cie. Sud Atlantique. Length, 577 ft. 1 in.; Gross Tonnage, 15,368;
Funnels: Buff, Black Tops.

EMPRESS OF ASIA. EMPRESS OF RUSSIA. Canadian Pacific.
Length, 570 ft.: Gross Tonnage, 16,909 and 16,810;
Funnels: Yellow.

MONARCH OF BERMUDA. Furness Withy. Length, 553 ft. 2 ins.;
Gross Tonnage 22,424;
Funnels: Black, Red, Thin Black and Red Bands, Black Tops.

TRANSYLVANIA. CALEDONIA. Anchor Henderson.
Length, 552 ft. 4 ins. and 553 ft.; Gross Tonnage, 16,923 and 17,046;
Funnels: Black.

CHAMPOLLION. MARIETTE PACHA. Messageries Maritimes.
Length, 495 ft. 1 in. and 508 ft. 5 ins.; Gross Tonnage, 12,263 and 12,239.;
Funnels: Black.

TAIREA. TAKLIWA. TALAMBA. British India S.N. Co.
Length, 449 ft. 6 ins.; Gross Tonnage, 8,000;
Funnels: Black, Two White Bands, Black Tops.

PRINCE DAVID. PRINCE HENRY. PRINCE ROBERT. Canadian National Railways.
Length, 366 ft. 4 ins.: Gross Tonnage, 6,892.

PRINCESS KATHLEEN. PRINCESS MARGUERITE. Canadian Pacific.
Length, 350 ft.; Gross Tonnage, 6,000;
Funnels: Yellow, Black Top.

CIUDAD DE BUENOS AIRES. Argentine S.N. Co. CIUDAD DE MONTE VIDEO, Uruguayan S.N. Co. Length, 350 ft.; Gross Tonnage, 3,864;
Funnels: Yellow, Black Tops.

PRINCESS ELAINE. Canadian Pacific. Length 291 ft.; Gross Tonnage, 2,000;
Funnels Yellow, Black Top.

BREMEN. EUROPA. Norddeutscher Lloyd. Length, 898 ft. 7 ins. and 890 ft 2 ins.
Gross Tonnage, 51,656 and 49,746;
Funnels: Yellow.

HOMERIC. White Star. Length, 751 ft.; Gross Tonnage, 34,351;
Funnels: Buff, Black Tops.

COLUMBUS. Norddeutscher Lloyd. Length, 749 ft. 6 ins.; Gross Tonnage, 32,565;
Funnels: Yellow.

ADRIATIC. BALTIC. White Star. Length, 709 ft. 2 ins.;
Gross Tonnage, 24,679 and 23,884;
Funnels: Buff, Black Tops.

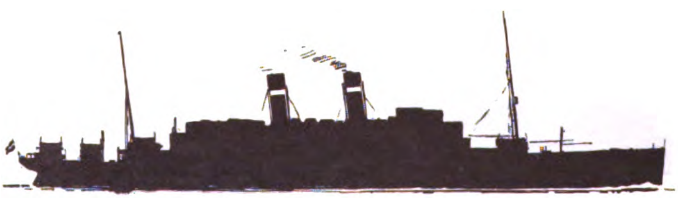
GEORGE WASHINGTON. United States Lines. Length, 699 ft. 1 in.;
Gross Tonnage, 23,788;
Funnels: Red, White Band, Blue Top.

M.S. BRITANNIC. **White Star.** Length, 683 ft. 6 ins.; Gross Tonnage, 26,943;
Funnels: Buff, Black Tops.

M.S. AUGUSTUS. **Navigazione Generale Italiana.** Length, 666 ft. 3 ins.;
Gross Tonnage, 32,650;
Funnels: Black, White Band.

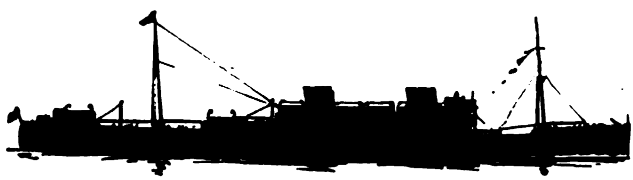
ROMA. **Navigazione Generale Italiana.** Length, 664 ft. 7 ins.; Gross Tonnage, 32,583;
Funnels: Black, White Band.

CONTE GRANDE. CONTE BIANCAMANO. **Lloyd Sabaudo.**
Length, 652 ft. 2 ins. and 650 ft. 9 ins.; Gross Tonnage, 25,661 and 24,416;
Funnels: Yellow, White Band between Two Narrow Blue.



ROTTERDAM. **Holland-Amerika.** Length, 650 ft. 5 ins.; Gross Tonnage, 24,149;
Funnels: Buff, Two Green Bands with White Band between, Buff Tops

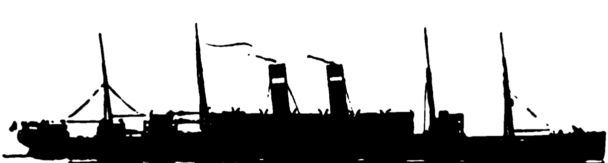
ORFORD. ORAMA. ORONSAY. ORONTES. OTRANTO. Orient. Length, 632 ft.; Gross Tonnage, about 20,000; Funnels: Cream.



M.S. WARWICK CASTLE. M.S. WINCHESTER CASTLE. M.S. CARNARVON CASTLE. Union Castle Line. Length, 651 ft. 5 ins., 631 ft. 6 ins., and 630 ft. 7 ins.; Gross Tonnage, 20,445, 20,109, and 20,063; Funnels: Red, Black Tops.

M.S. ALCANTARA. M.S. ASTURIAS. Royal Mail Steam Packet Co. Length, 630 ft. 5 ins.; Gross Tonnage, 22,181 and 22,071; Funnels: Buff.

PRESIDENT HOOVER. PRESIDENT COOLIDGE. Dollar Steamship Lines. Length, 615 ft.; Gross Tonnage, 21,936; Funnels: Black, White $ on Red Band.



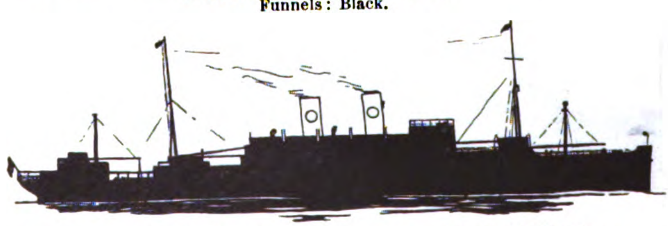
LAPLAND. Red Star. Length, 606 ft. 8 ins.; Gross Tonnage, 18,866; Funnels: Black, White Band.

ALBERT BALLIN. DEUTSCHLAND. Hamburg-Amerika Line. Length, 602 ft. 4 ins.; Gross Tonnage, 20,931 and 20,742; Funnels: Yellow, with Black, White and Red Band at Tops.

NEW YORK. HAMBURG. Hamburg-Amerika Line. Length, 602 ft. 5 ins.; Gross Tonnage. 21,867 and 21,691; Funnels: Yellow, with Black, White and Red Band at Tops.

DUILIO. GIULIO CESARE. Navigazione Generale Italiana. Length, 602 ft. 4 ins.; Gross Tonnage. 24,281 and 21,657; Funnels: Black, Broad White Band.

MOOLTAN. MALOJA. Peninsular and Oriental. Length, 600 ft. 8 ins. Gross Tonnage, 20,952 and 20,914; Funnels: Black.



M.S. KUNGSHOLM. Swedish American Line. Length, 594 ft. 9 ins.; Gross Tonnage, 20,223; Funnels: Yellow, Blue Discs on Sides.

ALBERTIC. White Star. Length, 590 ft. 8 ins.; Gross Tonnage, 18,940; Funnels: Buff, Black Tops.

VIRGINIA. CALIFORNIA. American S.S. Corporation. Length, 586 ft. 4 ins. and 574 ft. 4 ins.; Gross Tonnage, 20,773 and 20,325;
Funnels: Black, White Band.

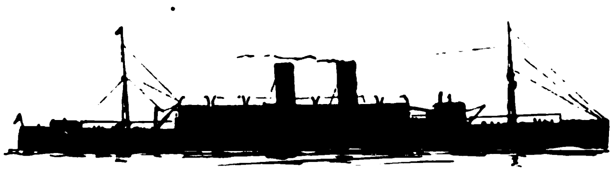
VICEROY OF INDIA. Peninsular and Oriental. Length, 582 ft. 7 ins.;
Gross Tonnage; 19,648;
Funnels: Black.

DUCHESS OF ATHOLL. DUCHESS OF BEDFORD. DUCHESS OF RICHMOND DUCHESS OF YORK. Canadian Pacific. Length, 581 ft. 9 ins.;
Gross Tonnage, 20,123 to 20,021;
Funnels: Yellow.

ORMONDE. Orient Line. Length, 580 ft. 5 ins.; Gross Tonnage, 14,982;
Funnels: Cream.

M.S. AORANGI. Canadian-Australasian Line. Length, 580 ft.; Gross Tonnage, 17,491;
Funnels: Red, Black Tops.

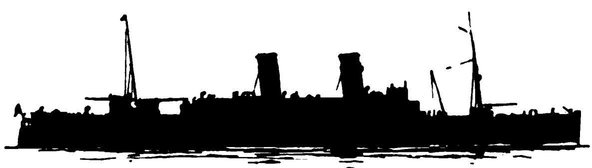
M.S. MARNIX VAN ST. ALDEGONDE. M.S. JOHAN VAN OLDENBARNEVELT.
Stoomvaart Maatschappij Nederland. Length, 580 ft.;
Gross Tonnage, 19,129 and 19,040;
Funnels: Buff, Black Tops.



LAURENTIC. **White Star.** Length, 578 ft. 2 in.; Gross Tonnage, 18,724; Funnels: Buff, Black Tops.

DORIC. **White Star.** Length, 575 ft. 5 ins; Gross Tonnage, 16,484; Funnel: Buff, Black Tops.

WESTERNLAND. PENNLAND. **Red Star.** Length, 575 ft. 3 ins.; Gross Tonnage, 16,500 and 16,322; Funnel: Black, White Band.



EMPRESS OF FRANCE. **Canadian Pacific.** Length, 571 ft. 4 ins.; Gross Tonnage, 18,452; Funnels: Yellow.

SAXON. **Union Castle Line.** Length 570 ft. 5 ins; Gross Tonnage, 12,385; Funnels: Red, Black Tops.

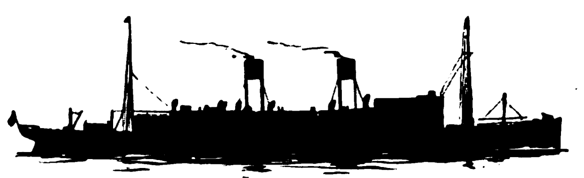
CONTE VERDE. CONTE ROSSO. **Lloyd Sabaudo.** Length, 570 ft. 2 ins. Gross Tonnage, 18,765 and 17,048; Funnels: Yellow, White Band between Two Narrow Blue.

ARMADALE CASTLE. KENILWORTH CASTLE. **Union Castle Line** Length, 570 ft. 1 in.; Gross Tonnage 12,973 and 12,975; Funnels: Red, Black Tops.

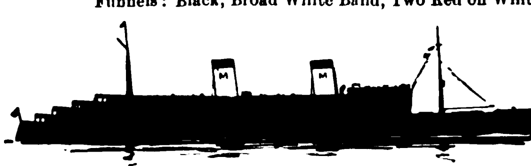
BALMORAL CASTLE. EDINBURGH CASTLE. Union Castle Line.
Length, 570 ft.; Gross Tonnage, 13,361 and 13,330;
Funnels: Red, Black Tops.

M.S. CHICHIBU MARU. M.S. TATSUTA MARU. M.S. ASAMA MARU. Nippon Yusen Kaisha. Length, 560 ft.; Gross Tonnage, 17,498 to 16,975;
Funnels: Black, Broad White Band, Two Red on White

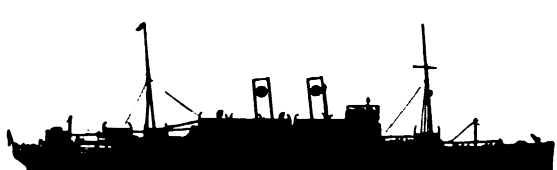
ROCHAMBEAU. Cie. Générale Transatlantique. Length, 559 ft. 4 ins.; Gross Tonnage, 12,678
Funnels: Red, Black Tops.



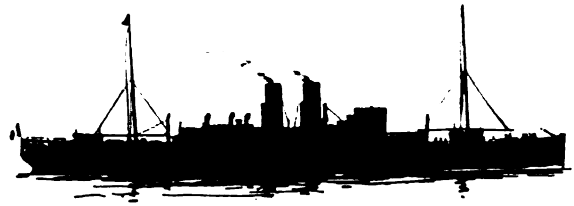
SHINYO MARU. Nippon Yusen Kaisha. Length, 558 ft.;
Gross Tonnage, 13,026;
Funnels: Black, Broad White Band, Two Red on White.



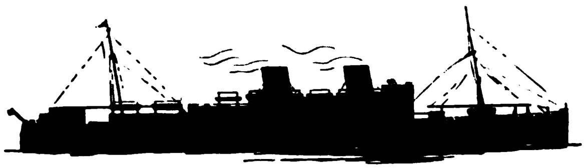
MALOLO. Matson Line. Length, 554 ft.; Gross Tonnage, 17,232;
Funnels: Yellow, Black Tops, "M" on sides.



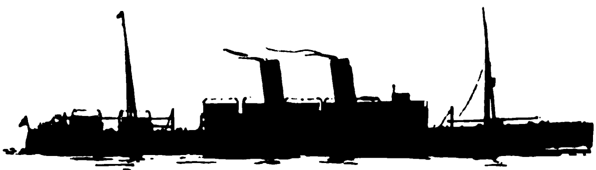
M.S. GRIPSHOLM. Swedish American Line. Length, 553 ft; Gross Tonnage, 17,716;
Funnels: Yellow, Blue Discs on Sides.



DE GRASSE. Cie. Générale Transatlantique. Length, 552 ft. 1 in.; Gross Tonnage, 17,759; Funnels: Red, Black Tops.



M.S. REINA DEL PACIFICO. Pacific Steam Navigation Co. Length, 551 ft.; Gross Tonnage, 17,707; Funnels: Buff.



VEENDAM. VOLENDAM. Holland-Amerika Line. Length, 550 ft. 2 ins.; Gross Tonnage. 15,450 and 15,434; Funnels: Buff, White Band between Two Green.

DRESDEN. Norddeutscher Lloyd. Length, 550 ft.; Gross Tonnage 14,690; Funnels: Yellow.

MONTCALM. MONTCLARE. MONTROSE. Canadian Pacific. Length, 549 ft. 5 ins.; Gross Tonnage, 16,418 to 16,314; Funnels: Yellow.

RANCHI. RAWALPINDI. RANPURA. RAJPUTANA. P & O Length, 548 ft.; Gross Tonnage, 16,738 to 16,644; Funnels: Black,

M.S. MILWAUKEE. M.S. ST. LOUIS. Hamburg-Amerika. Length, 546 ft. 6 ins.;
Gross Tonnage, 16,6[illegible];
Funnels: Yellow, with Black, White and Red Bands at Tops.

D'ARTAGNAN. Messageries Maritimes. Length, 543 ft. 5 ins.;
Gross Tonnage, 15,105;
Funnels: Black.

GELRIA. Holland Lloyd. Length, 541 ft : Gross Tonnage, 13,8[illegible]8:
Funnels: Yellow, Black Band.

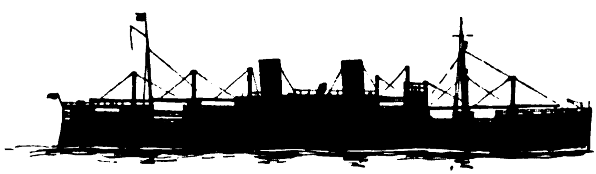
MALWA. MANTUA. P. & O. Length, 540 ft.;
Gross Tonnage, 10,9[illegible]6 and 10,946;
Funnels: Black.

NIEUW ZEELAND. NIEUW HOLLAND. Koninklijke Paketvaart Maatschappij.
Length, 540 ft.; Gross Tonnage, 11,060 and 11,057;
Funnels: Buff, narrow Black Top

ORSOVA. Orient Line. Length, 536 ft. 2 ins.; Gross Tonnage, 12,041;
Funnels: Cream.

M.S. FÉLIX ROUSSEL. **Messageries Maritimes.** Length, 534 ft. 8 ins.;
Gross Tonnage, 16,753;
Funnels: Black.

STAVANGERFJORD. **Norske Amerika Linie.** Length, 532 ft. 5 ins.; Gross Tonnage, 13,156;
Funnels: Yellow, Two Red and Two White Bands with Blue Band between.



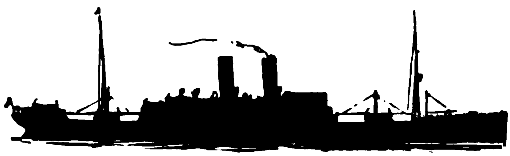
M.S. RANGITATA. RANGITANE. RANGITIKI. **New Zealand Shipping Co.**
Length, 531 ft.; Gross Tonnage, 16,737, 16,712, and 16,698:
Funnels: Yellow.

CHITRAL. COMORIN. CATHAY. **P. & O. Line.**
Length, 526 ft. 3 in., 523 ft. 5 ins. and 523 ft. 5 ins. Gross Tonnage, 15,396, 15,279, and 15,121;
Funnels: Black.

M.S. BERMUDA. **Bermuda & West Indies S.S. Co.** Length, 525 ft. 9 ins.;
Gross Tonnage, 19,086;
Funnels: Black, Red, Thin Black and Red Bands, Black Tops.

NIAGARA. **Union Steam Ship Co. of N.Z.** Length, 524 ft. 7 ins; Gross Tonnage, 13,415;
Funnels: Red, Black Tops.

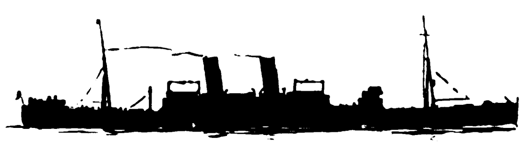
M.S. HIGHLAND MONARCH. HIGHLAND CHIEFTAIN. HIGHLAND BRIGADE. HIGHLAND PRINCESS. Nelson Line.
Length, 523 ft. 4 ins. ; Gross Tonnage. 14,137 to 14,128 ;
Funnels : Red, Two White Bands, Black between, Black Top.



FREDERIK VIII. Det Forenede Damskibs Selskab. Length, 523 ft. 5 ins.;
Gross Tonnage, 11,850 ;
Funnels : Black, Red Band.

CORFU. CARTHAGE. P. & O. Line. Length, 522 ft. 5 ins. ;
Gross Tonnage, 15,000 ;
Funnels : Black.

KAISAR-I-HIND. P. & O. Line. Length, 520 ft. ; Gross Tonnage, 11.518 ;
Funnels : Black.



MINNEDOSA. MELITA. Canadian Pacific. Length, 520 ft. ; Gross Tonnage, 15.186, and 15,183.
Funnels : Yellow.

BERGENSFJORD. Norske Amerika Linie. Length, 512 ft. 4 ins. ; Gross Tonnage, 11,015 ;
Funnels : Yellow, Two Red and Two White Bands with Blue Band between.

ARANDORA STAR. Blue Star Line. Length, 512 ft. 2 ins.; Gross Tonnage, 14,694; Funnels: Red, Black Tops and White Band, Blue Star on White Disc.

AVILA STAR. AVELONA STAR. ALMEDA STAR. ANDALUCIA STAR. Blue Star Line. Length, 510 ft. 2 ins. to 512 ft. 2 ins.; Gross Tonnage, 12,872 to 12,846; Funnels: Red, Black Tops and White Band, Blue Star on White Disc.

M.S. VICTORIA. Lloyd Triestino. Length, 511 ft. 5 ins.; Gross Tonnage, 13,500; Funnels: Black.

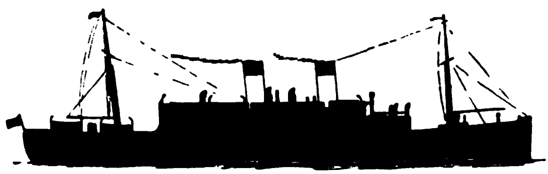
PORTHOS. Messageries Maritimes. Length, 510 ft. 8 ins.; Gross Tonnage, 12,692; Funnels: Black.

ANDRE LEBON. Messageries Maritimes. Length, 508 ft. 2 ins.; Gross Tonnage, 13,682; Funnels: Black.

GUADELOUPE. Cie. Générale Transatlantique. Length, 508 ft.; Gross Tonnage, 10,502; Funnels: Red, Black Tops.

METAGAMA. **Canadian Pacific.** Length, 500 ft. 4 ins.; Gross Tonnage, 12,420; Funnels: Yellow.

MONOWAI. **Canadian-Australasian Line.** Length, 500 ft. 4 ins.; Gross Tonnage, 10.852; Funnels: Red, Black Tops.



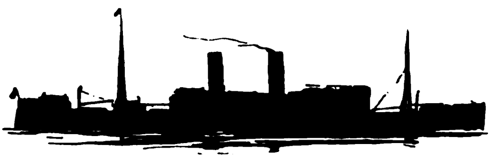
M.S. MONTE ROSA. M.S. MONTE PASCOAL. **Hamburg-Sud Amerika Line.** Length, 500 ft. 3 in.; Gross Tonnage, 13,882 and 13,870; Funnels: White, Red Tops.

M.S. GENERAL OSORIO. **Hamburg-Amerika Line.** Length, 498 ft. 5 ins.; Gross Tonnage, 11,590: Funnels: Yellow, with Black, White, and Red Band at Tops.

ALBERTVILLE. **Lloyd Royal Belge.** Length, 494 ft.; Gross Tonnage, 10,769; Funnels: Yellow.

M.S. LLANGIBBY CASTLE. **Union Castle Line.** Length, 486 ft.; Gross Tonnage, 11,951; Funnels: Red, Black Tops.

M.S. CABO SAN AGUSTIN. Ybarra & Co. Length, 482 ft. 5 ins.; Gross Tonnage, 11,637; Funnels: Black.



PATRIA. Rotterdam Lloyd (Wm. Ruys & Zonen). Length, 480 ft.; Gross Tonnage, 9,891; Funnels: Black.

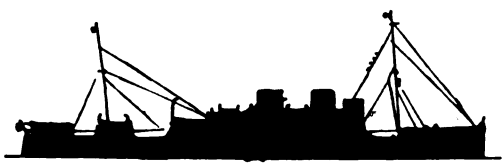
SPHINX. Messageries Maritimes. Length, 478 ft.; Gross Tonnage 11,375; Funnels: Black.

LEOPOLDVILLE. Lloyd Royal Belge. Length, 478 ft. 8 ins: Gross Tonnage, 11,256; Funnels: Yellow.

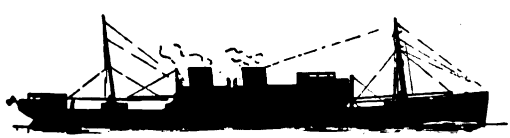
GANGE. Lloyd Triestino. Length, 477 ft. 5 ins.; Gross Tonnage, 12,272; Funnels: Black.

CUBA. Cie. Générale Transatlantique. Length, 476 ft.; Gross Tonnage, 11,337; Funnels: Red, Black Tops.

FLORIDA. Société Générale de Transports Maritimes à Vapeur.
Length, 471 ft. 2¼ ins. ; Gross Tonnage, 9,149 ;
Funnels : Black, Red Band.



M.S. DUNBAR CASTLE. Union Castle Line. Length, 471 ft. 2 ins. ;
Gross Tonnage, 10,002 ;
Funnels : Red, Black Tops.



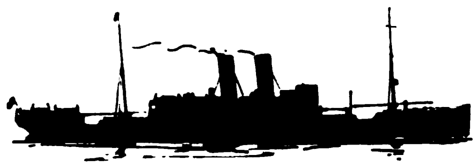
M.S. EUROPA. East Asiatic Co. Length, 465 ft. 4 ins. ; Gross Tonnage, 10,224 ;
Funnels : Yellow.

M.S. AMERIKA. East Asiatic Co. Length, 465 ft. 4 ins. ; Gross Tonnage, 10.110 ;
Funnels : Yellow.

M.S. JEAN LABORDE. Messageries Maritimes. Length, 463 ft. 6 ins. ;
Gross Tonnage, 11,414 ;
Funnels : Black.

M.S. WENATCHEE STAR. M.S. YAKIMA STAR. Blue Star Line.
Length, 460 ft. 4 ins. ; Gross Tonnage, 6,667 ;
Funnels : Red, Black Top and White Band, Blue Star on White Disc.

M.S. ACHIMOTA. Elder Dempster. Length, 460 ft.; Gross Tonnage, 10,000; Funnels: Buff

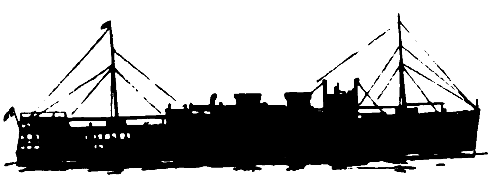


MARTHA WASHINGTON. Cosulich Line. Length, 459 ft.; Gross Tonnage, 8,347; Funnels: Red, White Band, Black Tops.

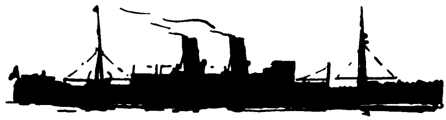
M.S. MAGDALENA. M.S. ORINOCO. Hamburg-Amerika. Length, 456 ft. 8 ins.; Gross Tonnage, 9,540; Funnels: Yellow, with Black, White, and Red Band at Tops.

TILAWA. TALMA. British India S.N. Co. Length, 451 ft.; Gross Tonnage, 10,006 and 10,000 Funnels: Black, Two White Bands, Black Tops.

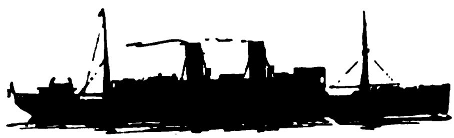
FLANDRIA. ORANIA. Holland Lloyd. Length, 450 ft.; Gross Tonnage, 10,171 and 9,763; Funnels: Yellow, Black Band.



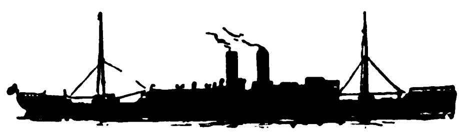
M.S. ERIDAN. Messageries Maritimes. Length, 445 ft. 4 ins.; Gross Tonnage, 9,928; Funnels: Black.



DE LA SALLE. Cie. Générale Transatlantique. Length, 440 ft.; Gross Tonnage, 8,400;
Funnels: Red, Black Tops.
SINAIA. Cyp. Fabre. Length, 440 ft.; Gross Tonnage, 8,666.



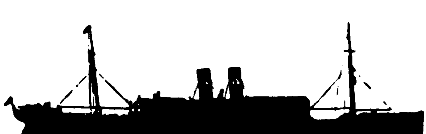
ASIE. Chargeurs Réunis. Length, 439 ft. 8 ins.; Gross Tonnage, 8,561;
Funnels: Yellow, Red Stars on White Band.



PEROU. Cie. Générale Transatlantique. Length, 432 ft. 5 ins.; Gross Tonnage, 6,599;
Funnels: Red, Black Tops.

M.S. THÉOPHILE GAUTIER. Messageries Maritimes. Length, 425 ft.;
Gross Tonnage, 9,000;
Funnels: Black.

SIMON BOLIVAR. Royal Nederlands Line. Length, 420 ft.; Gross Tonnage, 7,906;
Funnels: Black, Two White Bands.

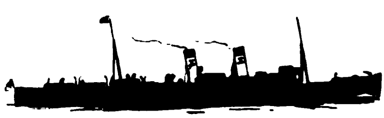


M.S. RIO BRAVO. M.S. RIO PANUCO. Flensburger Dampfer Co. (H. Schuldt).
Length, 410 ft.; Gross Tonnage, 5,945;
Funnels: Black, Blue Band, White Diamond with Red S.

RANGATIRA. Union Steamship Company of N.Z. Length, 406 ft. 1 in.; Gross Tonnage, 6,152; Funnels: Red, Black Tops.

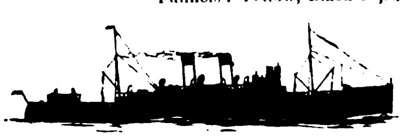
NAGASAKI MARU. SHANGHAI MARU. Nippon Yusen Kaisha. Length, 402 ft; Gross Tonnage, 5,272; Funnels: Black, White Band.

M.S. VENUS. Bergen Steamship Co. Length, 398 ft. 5 ins.; Gross Tonnage. 5,407; Funnels: Black, Three White Rings.

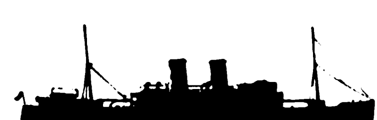


KEIFUKU MARU. Imperial Japanese Railway. Length, 385 ft.; Gross Tonnage, 5,831; Funnels: Yellow, Black Top, Red I on Yellow.

ANGLIA. CAMBRIA. HIBERNIA. SCOTIA. L.M.S. Railway. Length, 380 ft. 5 ins.; Gross Tonnage, 3,460; Funnels: Yellow, Black Tops.



VIENNA. AMSTERDAM. PRAGUE. London and North Eastern Railway. Length, 350 ft.; Gross Tonnage, 4,218; Funnels: Yellow, Black Tops.



DUKE OF ARGYLL. DUKE OF LANCASTER. DUKE OF ROTHESAY. London, Midland and Scottish Railway. Length, 349 ft.; Gross Tonnage, 3,608; Funnels: Yellow, Black Tops.

M.S. ULSTER MONARCH. ULSTER QUEEN. ULSTER PRINCE. Ulster Imperial Line.
Length, 346 ft.; Gross Tonnage, 3,759;
Funnels: Red, Black Top.

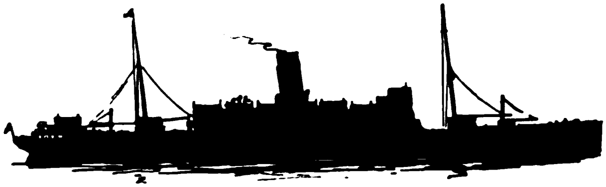
ANTWERP. MALINES. BRUGES. London and North Eastern Railway.
Length, 321 ft. 6 ins.; Gross Tonnage, 2,957;
Funnels: Yellow, Black Tops.

HANTONIA. NORMANNIA. Southern Railway. Length, 290 ft. 3 ins.;
Gross Tonnage, 1,567;
Funnels: Buff.

DIEPPE. Southern Railway. Length, 273 ft. 5 ins.; Gross Tonnage, 1,228;
Funnels: White. Black Tops.

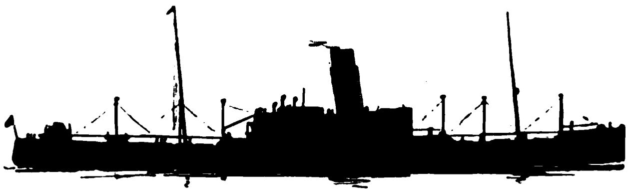
CERAMIC. White Star Line. Length, 655 ft. 1 in.; Gross Tonnage, 18,495;
Funnel: Buff, Black Top.

CHAMPLAIN. Cie. Générale Transatlantique. Length, 607 ft.;
Gross Tonnage, 26,000;
Funnel: Red, Black Top.



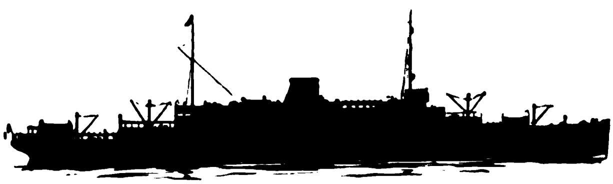
CARINTHIA. FRANCONIA. Cunard. Length, 600 ft. 7 ins. and 601 ft. 3 ins.;
Gross Tonnage, 20,277 and 20,175;
Funnel: Red, Black Top.

SCYTHIA. LACONIA. SAMARIA. Cunard. Length, 601 ft.;
Gross Tonnage, 19,761, 19,695, and 19,597;
Funnel: Red, Black Top.

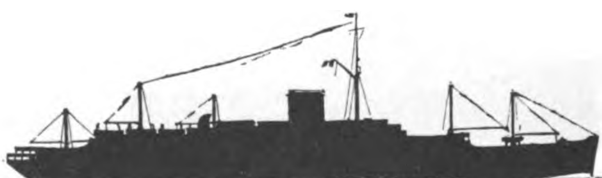


MINNETONKA. MINNEWASKA. Atlantic Transport. Length, 600 ft. 8 ins.;
Gross Tonnage, 21,998 and 21,716;
Funnel: Red, Black Top.

NIEUW AMSTERDAM. Holland-Amerika. Length, 600 ft. 3 ins.; Gross Tonnage, 17,149;
Funnel: Buff, White Band between Two Green.



M.S. VULCANIA. M.S. SATURNIA. Cosulich Line. Length, 599 ft. and 606 ft. 2 ins.;
Gross Tonnage, 23,970 and 23,940;
Funnel: Red, White Band and Black Top.



M.S. LAFAYETTE. Cie Générale Transatlantique. Length, 577 ft. 2 ins.;
Gross Tonnage, 25,178;
Funnel: Red, Black Top.

ALMANZORA. ATLANTIS. ARLANZA. Royal Mail Steam Packet Co.
Length, 570 ft.; Gross Tonnage, 15,551 to 14,622;
Funnel: Buff.

ULYSSES. NESTOR. Blue Funnel Line. Length, 563 ft. 2 ins.;
Gross Tonnage, 14,652 and 14,629;
Funnel: Blue, Black Top.

TUSCANIA. CALIFORNIA. Anchor. Length, 553 ft.; Gross Tonnage, 16,991 and 16,792;
Funnel: Black.

LANCASTRIA. Cunard. Length, 552 ft. 8 ins. Gross Tonnage, 16,243;
Funnel: Red, Black Top.
CAMERONIA. Anchor. Length, 552 ft. 4 ins.; Gross Tonnage, 16,297;
Funnel: Black.

MONGOLIA. MOLDAVIA. P. & O. Line. Length, 551 ft. 6 ins. and 552 ft. 4 ins.;
Gross Tonnage, 16,596 and 16,556;
Funnel: Black.

M.S. CHRISTIAAN HUYGENS. Stoomvaart Maatschappij Nederland.
Length, 551 ft. 5 ins.; Gross Tonnage, 15,704;
Funnels: Buff, Black Top.

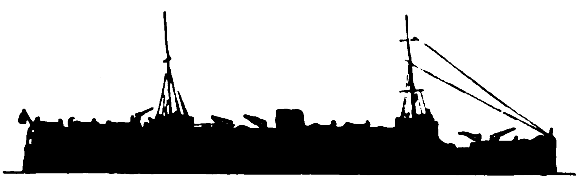
EURIPIDES. Aberdeen-White Star Line. Length, 550 ft. 7 ins.; Gross Tonnage, 14,947; Funnel: Buff.

MEGANTIC. White Star. Length, 550 ft. 4 ins.; Gross Tonnage, 14,878; Funnel: Buff, Black Top.

ORDUNA. Pacific Steam Navigation Co. Length, 550 ft. 3 ins.; Gross Tonnage, 15,507; Funnel: Buff.

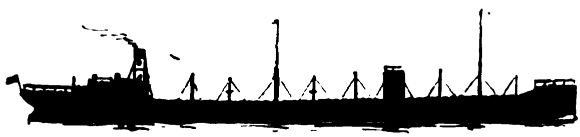
ORBITA. Pacific Steam Navigation Co. Length, 550 ft. 3 ins.; Gross Tonnage, 15,495; Funnel: Buff.

CALGARIC. White Star. Length, 550 ft. 3 ins.; Gross Tonnage, 16,063; Funnel: Buff, Black Top.

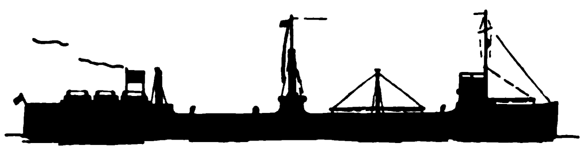


M.S. BALOERAN. Rotterdam Lloyd. Length, 550 ft.; Gross Tonnage, 16,981; Funnel: Black.

M.S. DEMPO. Rotterdam Lloyd. Length, 550 ft. ; Gross Tonnage, 16,979 ;
Funnel : Black.



BETHORE. Ore Steamship Co., N.Y. Length, 550 ft. ; Gross Tonnage, 8,257 ;
Funnel : Grey, Blue and White Bands, White O.

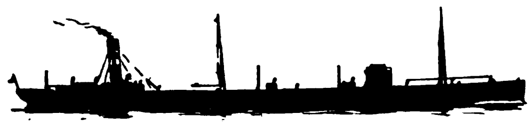


M.S. SIR JAMES CLARK ROSS. Hvalfanger A/S Rosshavet.
Length, 537 ft. 9 ins. ; Gross Tonnage, 14,362.

M.S. PIETER CORNELISZOON HOOFT. Stoomvaart Maatschappij Nederland.
Length, 534 ft. ; Gross Tonnage, 14,729 ;
Funnel : Buff, Black Top.

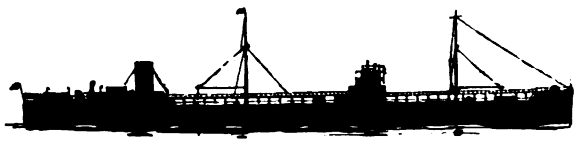
HOBSONS BAY. LARGS BAY. ESPERANCE BAY. JERVIS BAY. MORETON BAY.
Aberdeen-Commonwealth Line. Length, 530 ft. ; Gross Tonnage, 14,198 to 14,146 ;
Funnel : Yellow.

OROPESA. Pacific Steam Navigation Co. Length, 530 ft. ; Gross Tonnage, 14,075 ;
Funnel : Buff.



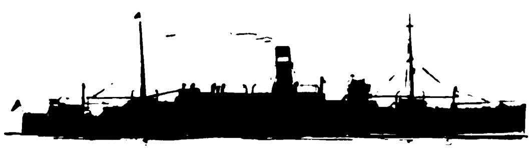
SAN MELITO. Eagle Oil Transport Co. Length, 530 ft. ; Gross Tonnage, 12,286 ;
Funnel : Black, Yellow Band, Black Eagle, Black O on White Band, Yellow Band.

CADILLAC. SARANAC. Anglo American Oil Co. Length, 530 ft. 2 ins. ;
Gross Tonnage, 12,076 and 12,074 ;
Funnel : Red, Black Top.



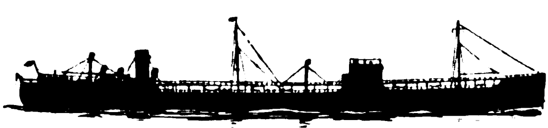
M.S. ATHELCROWN. United Molasses Co. Length, 526 ft. 5 ins. ; Gross Tonnage, 11,999 ;
Funnel : Red, B.M.Co. on White Diamond, Black Top.

ROTORUA. ARGYLLSHIRE. Federal Steam Navigation Co.
Length, 526 ft. 4 ins. and 526 ft. 2 ins. ;
Gross Tonnage, 12,112 and 11,916 ;
Funnel : Buff.



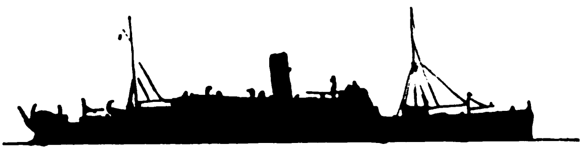
LETITIA. ATHENIA. Anchor-Donaldson. Length, 525 ft. 7 ins. and 526 ft. 3 ins. ;
Gross Tonnage, 13 475 and 13,465 ;
Funnel : Black, White Band, Black Top.

OROYA. Pacific Steam Navigation Co. Length, 525 ft. 3 ins. ; Gross Tonnage, 12,257 ;
Funnel : Buff.

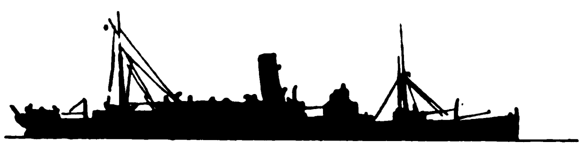


CALGAROLITE. Imperial Oil Co. Length, 522 ft. ; Gross Tonnage, 11,941 ;
Funnel : Black, Blue Band between Two White, Black Top.

M.S. F. H. BEDFORD, JUNR. Baltisch Amer. Petrol. Import.
Length, 521 ft. 4 ins.; Gross Tonnage, 11,952.

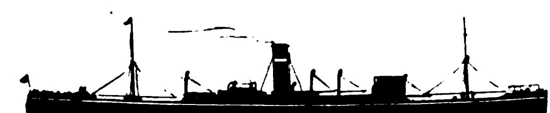


ALAUNIA ASCANIA. AURANIA. Cunard Line. Length, 520 ft.;
Gross Tonnage, 14,030 to 13,984;
Funnel: Red, Black Top.

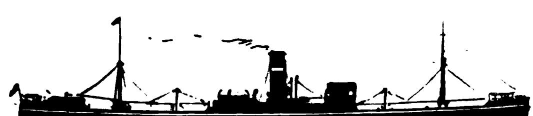


ANDANIA. AUSONIA. ANTONIA. Cunard Line. Length, 520 ft.;
Gross Tonnage, 13,950 to 13,867;
Funnel: Red, Black Top.

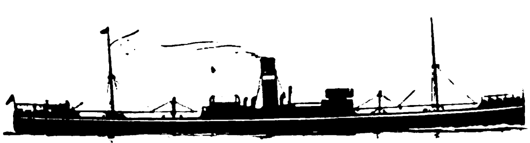
BARADINE. BARRABOOL. BALLARAT. BALRANALD. BENDIGO. P. & O.
Length, 519 ft. 9 ins.; Gross Tonnage, 13,072 to 12,972;
Funnel: Black.



MANGALORE. MATHURA. Brocklebank. Length, 518 ft.; Gross Tonnage, 9,571 and 9,743;
Funnel: Black, Blue and White Band, Black Top.

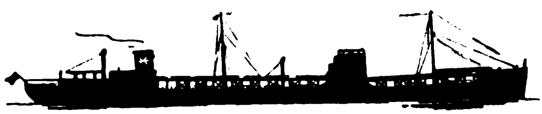


MALANCHA. Brocklebank. Length, 518 ft.; Gross Tonnage, 9,917;
Funnel: Black, Blue and White Band, Black Top.

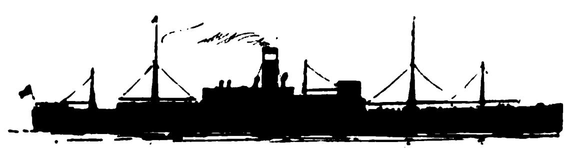


MACHARDA. Brocklebank. Length, 518 ft.; Gross Tonnage, 9,785;
Funnel: Black, Blue and White Band, Black Top.

DROTTNINGHOLM. **Swedish American Line.** Length, 517 ft.; Gross Tonnage, 11,055 ; Funnel: Yellow, Blue Disc.

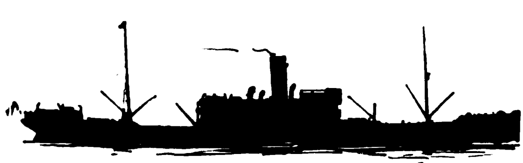


M.S. HARRY G. SEIDEL. **Baltisch Amer. Petrol. Import.** Length, 513 ft. 2 ins.; Gross Tonnage, 11,395.

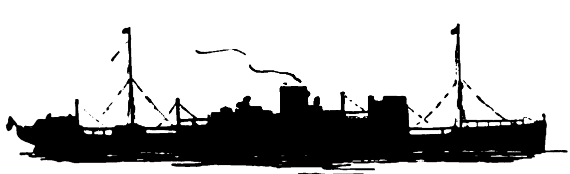


PRESIDENT ROOSEVELT. PRESIDENT HARDING. **United States Lines.** Length, 516 ft. 5 ins.. Gross Tonnage, 13,869 ; Funnel Red, White Band, Blue Top.

KRALJICA MARIJA. **Jugoslavenski Lloyd.** Length, 515 ft. 2 ins. Gross Tonnage, 10,196.

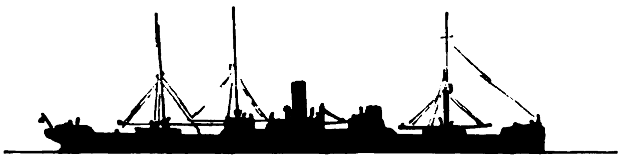


FUSHIMI MARU. SUWA MARU. **Nippon Yusen Kaisha.** Length, 513 ft. and 516 ft.; Gross Tonnage, 10,936 and 10,672 ; Funnel: Black.



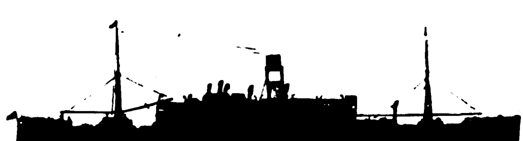
M.S. HIKAWA MARU. M.S. HEIAN MARU. M.S. HIYE MARU. **Nippon Yusen Kaisha.** Length, 510 ft. to 512 ft. 6 ins.; Gross Tonnage, 11,622; Funnels: Black.

ORCOMA. Pacific Steam Navigation Co. Length, 511 ft. 6 ins. Gross Tonnage, 11,580; Funnel: Buff.

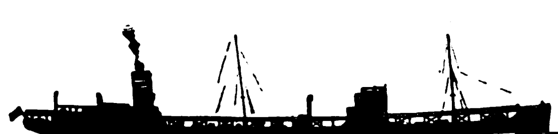


HORORATA. New Zealand Shipping Co. Length, 511 ft. 1 in.; Gross Tonnage, 11,243; Funnel: Buff.

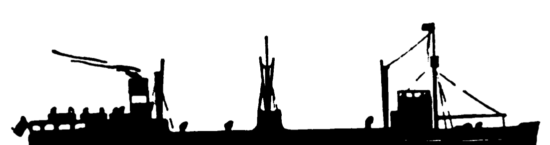
PHILOCTETES. ACHILLES. TYNDAREUS. Blue Funnel Line. Length, 511 ft. 9 ins., 507 ft. 4 ins., and 507 ft.; Gross Tonnage, 11,431 to 11,347; Funnel: Blue, Black Top.



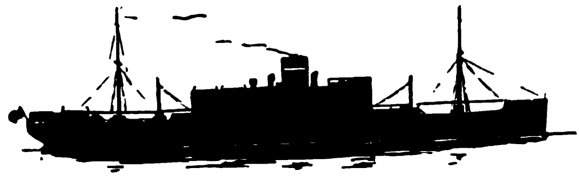
VOLTAIRE. VANDYCK. Lamport and Holt. Length, 510 ft. 6 ins.; Gross Tonnage, 13,248 and 13,233: Funnel: Blue, White Band. Black Top.



M.S. VICTOLITE. M.S. VANCOLITE. Imperial Oil Co. Length, 510 ft. 2 ins.; Gross Tonnage, 11,410 and 11,404; Funnel: Black, Blue Band between Two White, Black Top.



TAFELBERG. Kerguelen Sealing and Whaling Co. Length, 508 ft. 2 ins.; Gross Tonnage, 13,640.



M.S. TERUKUNI MARU. M.S. YASUKUNI MARU. Nippon Yusen Kaisha.
Length, 507 ft. and 505 ft.; Gross Tonnage, 11,930;
Funnel: Black, Broad White Band, Two Red on White.

BEAVERFORD. BEAVERHILL. BEAVERBURN. BEAVERBRAE. BEAVERDALE.
Canadian Pacific. Length, 503 ft.; Gross Tonnage, 10,042 to 9,956;
Funnel: Yellow.

PRESIDENT HAYES.	**Dollar Steamship Lines.**	Length, 502 ft.	;	Gross Tonnage,	10,533;
PRESIDENT MONROE.	,,	,,	,,	,,	10,533;
PRESIDENT VANBUREN.	,,	,,	,,	,,	10,533;
PRESIDENT ADAMS.	,,	,,	,,	,,	10,516;
PRESIDENT HARRISON.	,,	,,	,,	,,	10,504;
PRESIDENT POLK.	,,	,,	,,	,,	10,500;
PRESIDENT GARFIELD.	,,	,,	,,	,,	10,496;

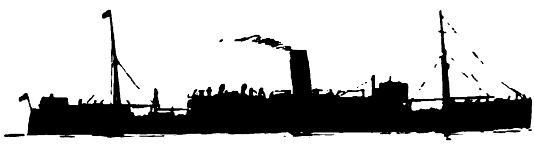
Funnel: Black, White $ on Red Band.

PORT MELBOURNE. PORT NAPIER. PORT SYDNEY. Commonwealth and Dominion Line. Length, 501 ft. 3 ins.; Gross Tonnage, 9,152;
Funnel: Red, Black Top.

DARRO. DEMERARA. DESNA. DESEADO. Royal Mail Steam Packet Co.
Length, 500 ft. 7 ins.; Gross Tonnage, 11,484 to 11,477;
Funnel: Buff.

THEMISTOCLES. Aberdeen-White Star Line. Length, 500 ft. 6 ins.;
Gross Tonnage, 11,231;
Funnel: Buff.

LLANSTEPHAN CASTLE. **Union Castle Line.** Length, 500 ft. 5 ins.;
Gross Tonnage, 11,293;
Funnel: Red, Black Top.

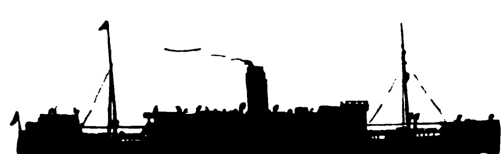


TAMAROA. MATAROA. **Shaw, Savill and Albion.** Length, 500 ft. 4 ins.;
Gross Tonnage, 12,354 and 12,333;
Funnel: Buff, Black Top.

FERNDALE. FORDSDALE. **Aberdeen Commonwealth Line.** Length, 500 ft.;
Gross Tonnage, 9,047;
Funnel: Yellow.

GLENIFFER. **Glen Line.** Length, 500 ft.; Gross Tonnage, 9,429;
Funnel: Red, Black Top.

CARNARVONSHIRE. **Royal Mail Steam Packet Co.** Length, 500 ft. 3 ins.;
Gross Tonnage, 9,406;
Funnel: Buff.

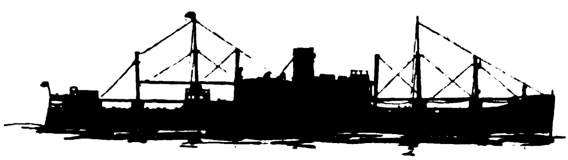


CRISTOBAL COLON. HABANA. **Compañia Trasatlantica.**
Length, 499 ft. 4 ins. and 480 ft.; Gross Tonnage, 10,833 and 10,551;
Funnel: Black.

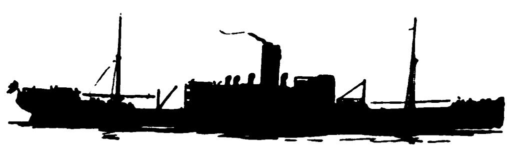
MAGDAPUR. MANIPUR. **Brocklebank Line.** Length, 499 ft. 6 ins.;
Gross Tonnage, 9,237;
Funnel: Black, Blue and White Band, Black Top.

ANTONIO DELFINO. **Hamburg-South Amerika.** Length, 499 ft. 5 ins ;
Gross Tonnage, 13,589 ;
Funnel : White, Red Top.

SARPEDON. HECTOR. ANTENOR. · **Blue Funnel Line.**
Length, 499 ft., 498 ft. 8 ins., 497 ft. 7 ins. ; Gross Tonnage, 11,321 to 11,174 ;
Funnel : Blue, Black Top.

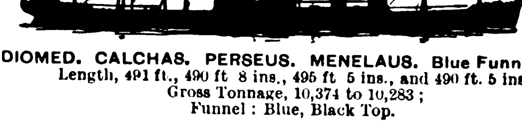


EASTERN PRINCE. WESTERN PRINCE. NORTHERN PRINCE. SOUTHERN PRINCE
Prince Line. Length, 496 ft. 2 ins. ; Gross Tonnage, 10,926 to 10,917 ;
Funnel : Black, Two Red Bands, Feathers on side.

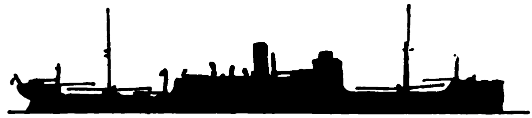


HARUNA MARU. HAKUSAN MARU. HAKONE MARU. HAKOZAKI MARU.
Nippon Yusen Kaisha. Length, 495 ft. ; Gross Tonnage, 10,421 to 10,380 ;
Funnel : Black.

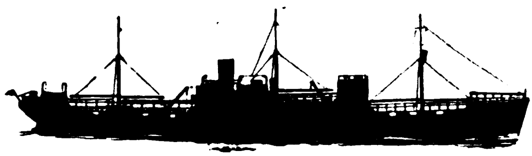
AENEAS. ASCANIUS. ANCHISES. Blue Funnel Line. Length, 493 ft. ;
Gross Tonnage, 10,058 to 10,000 ;
Funnel : Blue, Black Top.



DIOMED. CALCHAS. PERSEUS. MENELAUS. Blue Funnel Line.
Length, 491 ft., 490 ft 8 ins., 495 ft 5 ins., and 490 ft. 5 ins. ;
Gross Tonnage, 10,374 to 10,283 ;
Funnel : Blue, Black Top.

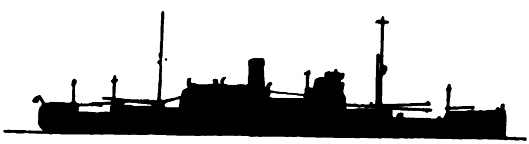


M.S. DELFTDIJK. M.S. DAMSTERDIJK. Holland-America. Length, 490 ft. 9 ins.; Gross Tonnage, 10,220 and 10,155; Funnel: Buff, White Band between Two Green.

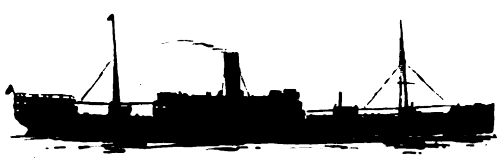


M.S. POELAU BRAS. POELAU LAUT. POELAU ROEBIAH. POELAU TELLO. Stoomvaart Maatschappij Nederland. Length, 490 ft.; Gross Tonnage, 9,250; Funnel: Buff, Black Top.

CITY OF EXETER. Ellerman City Line. Length, 486 ft. 7 ins.; Gross Tonnage, 9,447; Funnel: Buff, White Band, Black Top.



SULTAN STAR. M.S. TUSCAN STAR. Blue Star Line. Length, 486 ft. 1 in. and 471 ft., Gross Tonnage, 12,326 and 11,449; Funnel: Red, Black Top and White Band on Black, Blue Star on White Disc.



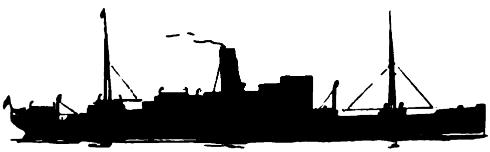
REMUERA. New Zealand Shipping Co. Length, 485 ft.; Gross Tonnage, 11,383; Funnel: Yellow.

M.S. GLENAPP. M.S. GLENBEG. M.S. GLENGARRY. M.S. GLENOGLE. Glen Line. Length, 485 ft.: Gross Tonnage, 9,460; Funnel: Red, Black Top.

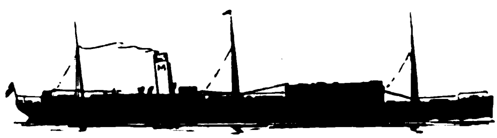
M.S. DINTELDIJK. M.S. DRECHTDIJK. Holland Amerika. Length, 485 ft.; Gross Tonnage, 9,399; Funnel: Buff, Two Green Bands, White between, Buff Top.

M.S. LOCHKATRINE. M.S. LOCHGOIL. M.S. LOCHMONAR. Royal Mail Steam Packet Co. Length, 485 ft.: Gross Tonnage, 9,409; Funnel: Buff.

CITY OF PARIS. Ellerman City Line. Length, 484 ft. 7 ins. ; Gross Tonnage, 10,902 ;
Funnel : Buff, White Band, Black Top.

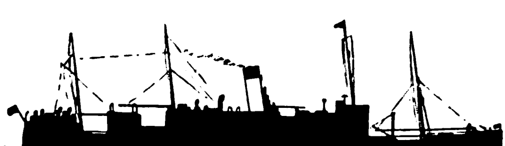


KERQUELEN. Chargeurs Réunis. Length, 484 ft. 2 ins. ; Gross Tonnage, 10,123
Funnel : Yellow, Red Stars on White Band.



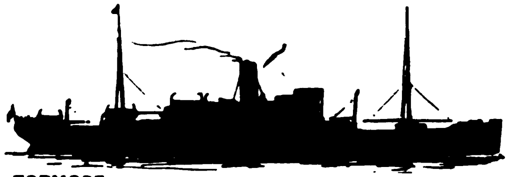
MAUI. Matson Navigation Co. Length 484 ft. ; Gross Tonnage, 9,801 ;
Funnel : Yellow, Black Top, with "M."

M.S. STAFFORDSHIRE. SHROPSHIRE. CHESHIRE. Bibby Line.
Length, 483 ft 6 ins. ; Gross Tonnage, 10,654 to 10,560 ;
Funnel : Salmon Pink, Black Top.



M.S. WORCESTERSHIRE. Bibby Line. Length, 483 ft. ; Gross Tonnage, 11,453 ;
Funnel : Salmon Pink, Black Top.

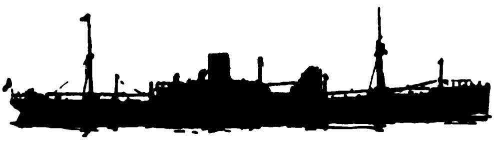
CEYLAN. Chargeurs Reunis. Length, 482 ft. 3 ins., Gross Tonnage, 8,430 ;
Funnel : Yellow, Red Stars on White Band.



FORMOSE } **GROIX.** }	**Chargeurs Réunis.**	**Length, 483 ft. 4 ins.;**	**Gross Tonnage,**	**9,975;**
BELLE ISLE.	,, ,,	,, **479 ft.;**	,, ,,	**9,591;**
AURIGNY.	,, ,,	,, **481 ft. 6 ins.;**	,, ,,	**9,589;**
DESIRADE } **EUBEE.** }	,, ,,	,, **483 ft. 4 ins.;**	,, ,,	**9,645;**

Funnel: Yellow, Red Stars on White Band.

COMPIÈGNE. CHANTILLY. Messageries Maritimes. Length 478 ft. 5 ins.;
Gross Tonnage 9,986;
Funnel: Black.

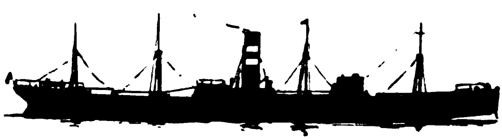


M.S. ZEALANDIC. M.S. COPTIC. Shaw Savill and Albion. Length, 482 ft. 6 ins;
Gross Tonnage, 8,281;
Funnel: Buff, Black Top.

M.S. CABO SAN ANTONIO. M.S. CABO SANTO TOME. Ybarra & Co.
Length, 482 ft. 5 ins.; Gross Tonnage, 11,657;
Funnel: Black.

YORKSHIRE. Bibby Line. Length, 482 ft. 4 ins.; Gross Tonnage. 10,184;
Funnel: Salmon Pink, Black Top.

LANCASHIRE. Bibby Line. Length, 482 ft. 4 ins.: Gross Tonnage, 9,445;
Funnel: Salmon Pink, Black Top.



DIPLOMAT. Harrison Line. Length, 482 ft.; Gross Tonnage. 8,218;
Funnel: Black, Red Band between Two White.

URUGUAY. **Compañia Trasatlantica.** Length, 481 ft. 9 ins.; Gross Tonnage, 10,348; Funnel: Black.

PORT ADELAIDE. PORT AUCKLAND. PORT BOWEN. PORT BRISBANE. PORT CAMPBELL. PORT CAROLINE. PORT HARDY. PORT HUNTER. PORT NICHOLSON. **Commonwealth and Dominion Line.** Length, 481 ft. 2 ins.; Gross Tonnage, 8,267 to 8,653; Funnel: Red, Black Top.

ARGENTINA. **Compañia Trasatlantica.** Length, 480 ft.; Gross Tonnage, 10,137; Funnel: Black.

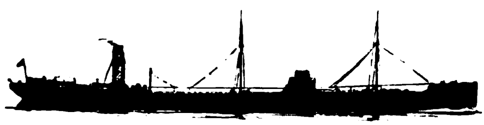
RUAHINE. **New Zealand Shipping Co.** Length, 480 ft. 6 ins.; Gross Tonnage, 10,870; Funnel: Yellow.

NEURALIA. NEVASA. **British India S.N. Co.** Length, 480 ft. 5 ins.; Gross Tonnage, 9,182; Funnel: Black, Two White Bands.

KASHGAR. KASHMIR. KARMALA. **P. & O. Line.** Length, 479 ft. 9 ins; Gross Tonnage, 9,000; Funnel: Black.

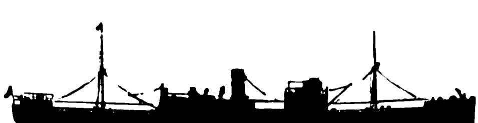
M.S. INDRAPOERA. Rotterdam Lloyd. Length, 479 ft. 5 ins.; Gross Tonnage, 10,678; Funnel: Black.

CITY OF SIMLA. Ellerman City Line. Length, 476 ft. 7 ins.; Gross Tonnage, 9,468; Funnel: Buff, White Band, Black Top.

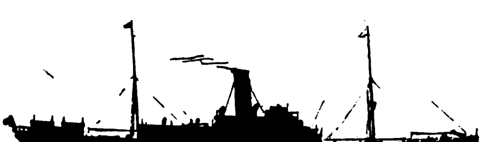


IROQUOIS. Anglo-American Oil Co. Length, 476 ft. 3 ins.; Gross Tonnage, 9,202; Funnel: Red, Black Top.

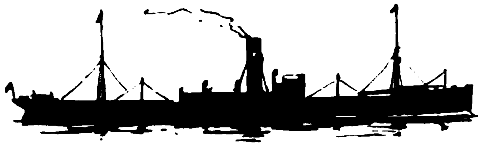
STUART STAR. AFRIC STAR. NAPIER STAR. RODNEY STAR. Blue Star Line. Length, 476 ft.; Gross Tonnage, 10,616 to 10,583; Funnel: Red, Black Top and White Band, Blue Star on White Disc.



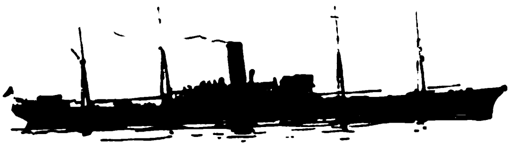
M.S. PORT ALMA. M.S. PORT FAIRY. M.S. PORT HUON. M.S. PORT FREMANTLE. M.S. PORT GISBORNE. Commonwealth and Dominion. Length, 477 ft. 3 ins.; Gross Tonnage, about 8,000; Funnel: Red, Black Top.



DUNLUCE CASTLE. DURHAM CASTLE. Union Castle. Length, 475 ft. 5 ins.; Gross Tonnage, 8,130; Funnel: Red, Black Top.



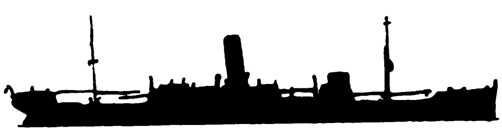
ARIZONA MARU. HAWAII MARU. MANILA MARU. AFRICA MARU.
Osaka Shosen Kaisha. Length, 475 ft.; Gross Tonnage, 9,618 to 9,414;
Funnel: Black, Two White Bands, joined at Side.



DOMINIA. Telegraph Construction and Maintenance Co. Length, 475 ft.;
Gross Tonnage, 9,250;
Funnel: Yellow.

OXFORDSHIRE. Bibby Line. Length, 474 ft. 7 ins., Gross Tonnage, 8,624;
Funnel: Salmon Pink, Black Top.

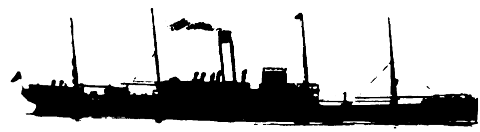
LLANDAFF CASTLE. LL DOVERY CASTLE. Union Castle Line.
Length, 471 ft. 1 in; Gross Tonnage, 10,786, and 10,609:
Funnel: Red, Black Top.



HERMINIUS. Shaw, Savill, and Albion Co. Length 477 ft.; Gross Tonnage, 8,000;
Funnel: Buff, Black Top.

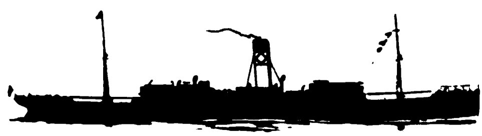
M.S. OPAWA. M.S. ORARI. M.S. OTAIO. New Zealand Shipping Co.
Length, 471 ft., 471 ft. and 472 ft. 2 ins.; Gross Tonnage, 10,107, 10,107, and 10,048;
Funnel: Yellow.

MAIDAN. MAHOUT. MAHSEER. MAHRONDA. MAIHAR. MALAKAND. MATHERAN. MANAAR. Brocklebank. Length, 470 ft. 4 ins.;
Gross Tonnage, 8,077;
Funnel: Black, Blue and White Band. Black Top.



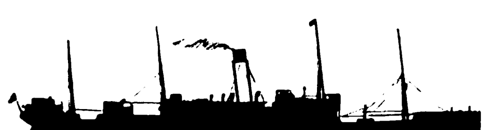
WARWICKSHIRE. Bibby Line. Length, 470 ft. 3 ins.; Gross Tonnage, 7,126;
Funnel: Salmon Pink, Black Top

MALAKUTA. MAHANADA. Brocklebank. Length, 470 ft. 2 ins.; Gross Tonnage, 7,205;
Funnel: Black, Blue and White Band, Black Top.

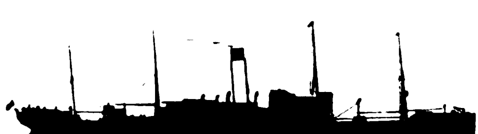


CALAMARES. PASTORES. United Fruit Co. Length, 470 ft. 4 ins.;
Gross Tonnage, 7,233 and 7,242;
Funnel: Buff, White Diamond on Red Band, Black Top.

CITY OF NAGPUR. Ellerman City Line. Length, 469 ft. 9 ins.; Gross Tonnage, 10,138;
Funnel: Buff, White Band, Black Top.



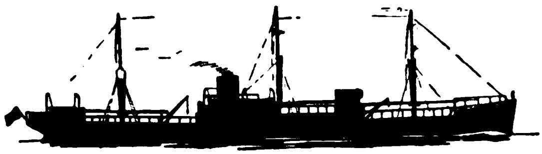
GLOUCESTERSHIRE. Bibby Line. Length, 467 ft. 2 ins.; Gross Tonnage, 8,124;
Funnel: Salmon Pink, Black Top.



LEICESTERSHIRE. Bibby Line. Length, 467 ft. 2 ins.; Gross Tonnage, 8,069;
Funnel: Salmon Pink, Black Top.

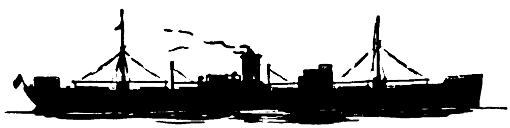
AMARAPOORA. **Henderson Line.** Length, 465 ft. 8 ins.; Gross Tonnage, 8,012; Funnel: Black.

MADURA. MALDA. MANTOLA. MATIANA. MODASA. **British India S.N. Co.** Length. 465 ft. 2 ins.; Gross Tonnage, about 9,000; Funnels: Black, Two White Bands, Black Top.



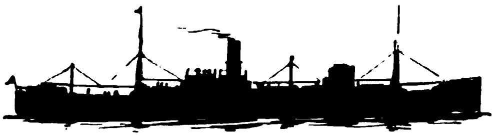
TAJANDOEN. **Stoomvaart Maatschappij Nederland.** Length, 465 ft.; Gross Tonnage, 8,800; Funnel: Buff, Black Top.

M.S. PORT DUNEDIN. M.S. PORT HOBART. **Commonwealth and Dominion Line.** Length, 465 ft.; Gross Tonnage, 7.500; Funnel: Red, Black Top.



M.S. THURLAND CASTLE. M.S. PENRITH CASTLE. **Lancashire Shipping Co.** Length, 464 ft. 6 ins.; Gross Tonnage, 6,372 and 6,369; Funnel: Red, Black Top.

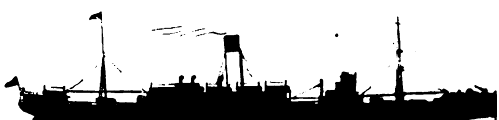
M.S. BUENOS AIRES MARU. M.S. RIO DE JANEIRO MARU. **Osaka Shosen Kaisha.** Length, 461 ft. 3 ins.; Gross Tonnage, 9,626; Funnel: Black, Two White Bands joined at Side.



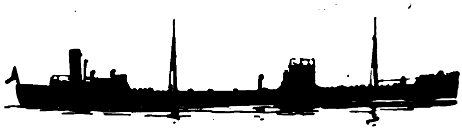
TEKOA. TONGARIRO. TURAKINA. New Zealand Shipping Co. Length, 460 ft. 5 ins.; Gross Tonnage, 8,565 to 8,531; Funnel: Yellow.

KENT. MIDDLESEX. SURREY. Federal Steam Nav. Co. Funnel: Red, Black Top. St. George's Flag with Blue Square in centre, on Red.

M.S. HEIYO MARU. Nippon Yusen Kaisha. Length, 460 ft.; Gross Tonnage, 9,816; Funnel: Black, Broad White Band, Two Red on White.

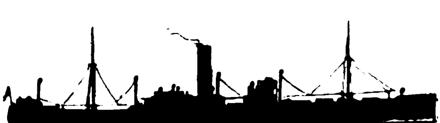


TAINUI. Shaw, Savill, and Albion Co. Length, 477 ft. 8 ins.; Gross Tonnage, 9,965; Funnel: Buff, Black Top.

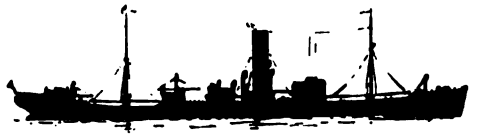


M.S. GULFCREST. Gulf Refining Co. of New York. Length, 460 ft.; Gross Tonnage, 8,950.

RAJULA. ROHNA. British India S. N. Co. Length, 460 ft.; Gross Tonnage, 8,478 and 8,602; Funnel: Black, Two close White Bands.



CITY OF LYONS. Ellerman Line. Length, 455 ft.; Gross Tonnage, 7,063; Funnel: Buff, White Band, Black Top.



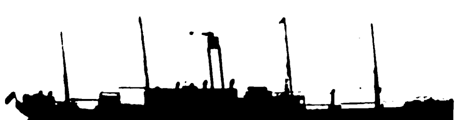
AGAPENOR. AUTOLYCUS. AUTOMEDON. DARDANUS. ELPENOR. EUMAEUS. GLAUCUS. HELENUS. LYCAON. MACHAON. MENTOR. MERIONES. PHEMIUS. PYRRHUS. RHEXENOR. TEIRESIAS. TROILUS. Blue Funnel Line.
Length, 455 ft. 2 ins.; Gross Tonnage, 7,552 to 7,957;
Funnel: Blue, Black Top.

EL SALVADOR. COSTA RICA. Nederland Stoomvaart Maatschappij.
Length, 455 ft.; Gross Tonnage, 8,300;
Funnel: Buff, Black Top.

COLLEGIAN. Harrison Line. Length, 455 ft.; Gross Tonnage, 5,850;
Funnel: Black, Red Band between Two White.

CLAN MACTAGGART. CLAN MACTAVISH. Clan Line. Length, 452 ft. 7 ins., and 469 ft.; Gross Tonnage, 7,602, and 7,619;
Funnel: Black, Two Red Bands.

GARTH CASTLE. GRANTULLY CASTLE. GLOUCESTER CASTLE. GUILDFORD CASTLE. Union Castle. Length, 452 ft. 6 ins.; Gross Tonnage, 7,715;
Funnel: Red, Black Top.



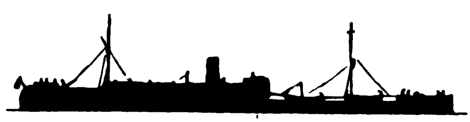
HEREFORDSHIRE. Bibby Line. Length, 452 ft. 3 ins.; Gross Tonnage, 7,126;
Funnel: Salmon Pink, Black Top.

MANUEL ARNUS. Compañia Trasatlantica. Length, 435 ft.; Gross Tonnage, 7,578;
Funnel: Black.

M.S. SILVERPALM. M.S. SILVERWILLOW. M.S. SILVERYEW. Silver Line.
Length, 450 ft. 9 ins.; Gross Tonnage, 6,373.

M.S. ACCRA. M.S. APAPA. Elder Dempster. Length, 450 ft. 7 ins.;
Gross Tonnage, 9.337 and 9,333;
Funnel: Buff.

M.S. ABA. M.S. ADDA. Elder Dempster. Length, 450 ft. 5 ins. and 435 ft. 3 ins;
Gross Tonnage, 7.957 and 7,816;
Funnel: Buff.



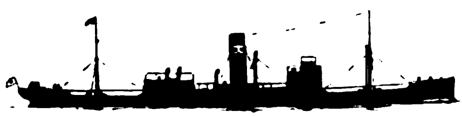
M.S. SOMERSETSHIRE. M.S. DORSETSHIRE. Bibby Line. Length, 450 ft. 8 ins.;
Gross Tonnage, 9,648, and 9,345;
Funnel: Pink, Black Top.

EXCALIBUR. EXETER. EXCAMBION. EXOCHORDA. American Export Lines.
Length, 450 ft.; Gross Tonnage, 9,360.

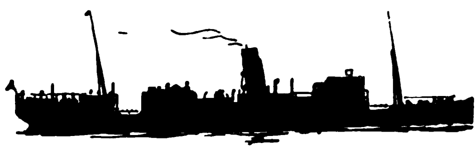
M.S. DOMALA. British India S.N. Co. Length, 450 ft.; Gross Tonnage, 8,441;
Funnel: Black, Two White Bands, Black Top.

CITY OF NEW YORK. American-South African Line.
Length, 450 ft.; Gross Tonnage, 8,272.

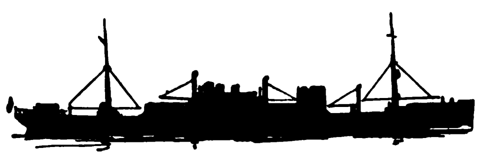
BRITANNIA. Anchor. Length, 450 ft.; Gross Tonnage, 8,464; Funnel: Black.



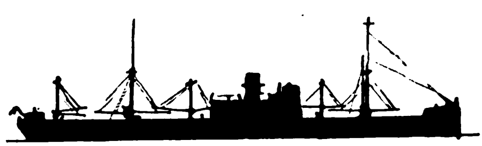
LONDON MARU. PARIS MARU. Osaka Shosen Kaisha. Length, 410 ft. 1 in.; Gross Tonnage, 7,191: Funnel: Black, Two White Bands joined at Sides.



MAKURA. Union Steam Ship Co. of N.Z. Length, 450 ft.; Gross Tonnage, 8,075; Funnel: Red, Black Top.

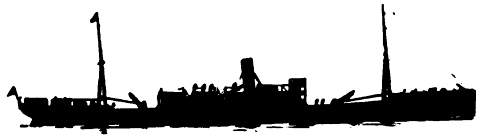


M.S. ESQUILINO. M.S. VIMINALE. Lloyd Triestino. Length, 450 ft. and 467 ft. 5 ins.; Gross Tonnage, 8,657.



MANCHESTER REGIMENT. LONDON IMPORTER. LONDON MERCHANT.
Furness Lines. Length, 450 ft.; Gross Tonnage, 7,930; Funnel: Red, Black Top, Black Base and Black Band.

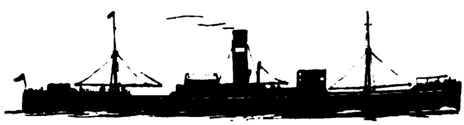
M.S. DURENDA. British India. Length, 450 ft.; Gross Tonnage, 7,241; Funnel: Black, Two Narrow White Bands.



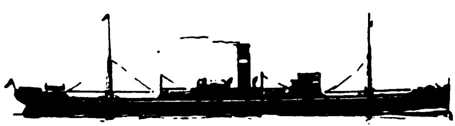
NOVARA. **P. & O. Line.** Length, 449 ft. 7 ins.; Gross Tonnage, 6,375;
Funnel: Black.

NELLORE. **NANKIN.** **Eastern and Australian Line.** Length, 450 ft.;
Gross Tonnage, about [illegible],000;
Funnel: Black.

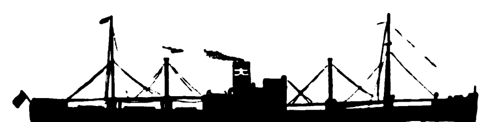
M.S. KOTA PINANG. **M.S. KOTA TJANDI.** **M.S. KOTA NOPAM.** **M.S. KOTA AGOENG.** **Rotterdam Lloyd.** Length, 449 ft.; Gross Tonnage, 7,275 to 7,331;
Funnel: Black.



MASIRAH. **Anchor-Brocklebank Line.** Length, 448 ft.; Gross Tonnage, 6,836;
Funnel: Black, Blue and White Band, Black Top.

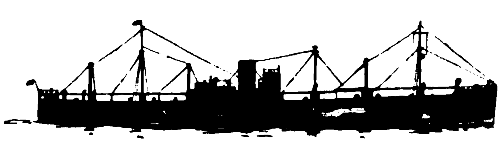


ANCHORIA. **Anchor-Brocklebank Line.** Length, 446 ft. 4 ins.; Gross Tonnage, 6,112;
Funnel: Black, Blue and White Band, Black Top.



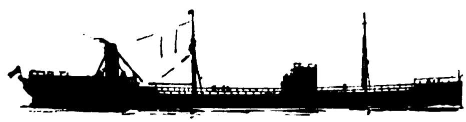
M.S. KINAI MARU. **M.S. TOKAI MARU.** **M.S. SANYO MARU.** **M.S. HOKUROKU MARU.** **Osaka Shosen Kaisha.** Length, 446 ft.; Gross Tonnage, 8,365;
Funnel: Black, Two White Bands joined at Side.

MAHRATTA. **MAKALLA.** **Anchor-Brocklebank Line.** Length, 445 ft.; Gross Tonnage, 6,690;
Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

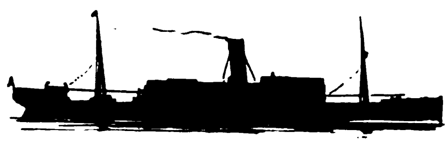


CINGALESE PRINCE. **Rio Cape Line.** Length, 441 ft. 8 ins.; Gross Tonnage, 6,750;
Funnel: Black, Two Red Bands, Feathers on side.

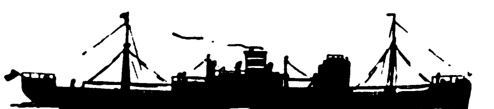
M.S. CHINESE PRINCE. M.S. JAPANESE PRINCE. M.S. JAVANESE PRINCE. M.S. MALAYAN PRINCE. Rio Cape Line. Length, 441 ft.; Gross Tonnage, 6,734; Funnel: Black, Two Red Bands, feathers on side.



BRITISH MERCHANT. British Tanker Co. Length, 440 ft. 7 ins.; Gross Tonnage, 6,994 Funnel: Red, White Band, Black Top; Green Band on White.



ZEELANDIA. Holland Lloyd. Length, 440 ft 7 ins.; Gross Tonnage, 7,995; Funnel: Yellow, Black Band.



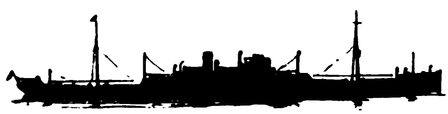
M.S. BARBARIGO. Società Veneziana. Length, 440 ft. 7 ins.; Gross Tonnage, 5,293; Funnel: Black, Red Band between Two White.

M.S. TJINEGARA. M.S. TJISADANE. Java-China-Japan Line. Length, 440 ft. 6 ins.; Gross Tonnage, 9,227; Funnel: Black.

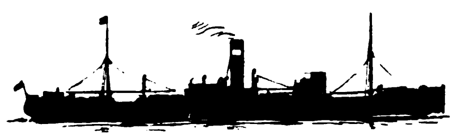
HILDEBRAND. Booth Line. Length, 440 ft. 3 ins.; Gross Tonnage, 6,995; Funnel: Black.

ELYSIA. Anchor. Length, 440 ft.; Gross Tonnage, 6,368; Funnel: Black.

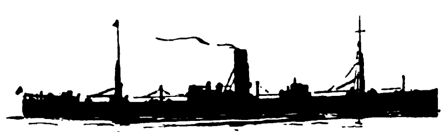
M.S. PACIFIC RELIANCE M.S. PACIFIC ENTERPRISE. M.S. PACIFIC RANGER.
Furness Withy. Length, 435 ft.; Gross Tonnage, 6,570;
Funnel: Black, Red, Thin Black and Red Band, Black Top.



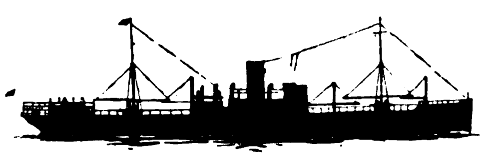
M.S. GLENAMOY. Glen Line. Length, 435 ft.; Gross Tonnage, 7,269;
Funnel: Red, Black Top.



CITY OF NORWICH. Ellerman (Hall Line). Length, 434 ft. 4 ins.; Gross Tonnage, 6,726;
Funnel: Buff, White Band, Black Top.

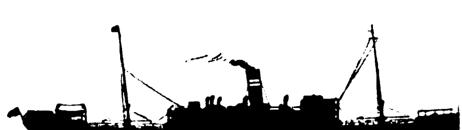


NAGINA. British India S.N. Co. Length, 433 ft.; Gross Tonnage, 6,651;
Funnel: Black, Two White Bands.

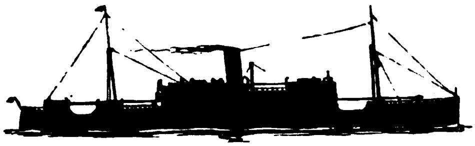


TJIBADAK. Java-China-Japan Line. Length, 433 ft.; Gross Tonnage, 7,803;
Funnel: Black.

M.S. DUNSTER GRANGE. Furness-Houlder. Length, 431 ft. 3 ins.;
Gross Tonnage, 9,494;
Funnel: Black, Red Band with White Maltese Cross, Black Top.



TAKADA. British India S.N. Co. Length, 430 ft. 1 in.; Gross Tonnage, 6,949;
Funnel: Black, Two White Bands Black Top.



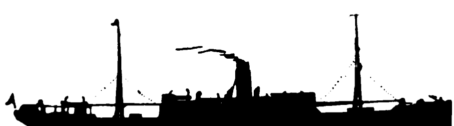
M.S. WESTRALIA. **Huddart Parker.** Length, 430 ft.; Gross Tonnage, 8,108; Funnel: Yellow.

M.S. LEIGHTON. M.S. LINNELL. **Lamport and Holt.** Length, 430 ft.; Gross Tonnage, 7,412; Funnel: Light Blue, White Band, Black Top.

M.S. UPWEY GRANGE. M.S. El ARGENTINO. **Furness-Houlder.** Length, 430 ft.; Gross Tonnage, 9,100; Funnel: Black, Red Band with White Maltese Cross, Black Top.

HARDWICKE GRANGE. **Furness-Houlder.** Length, 430 ft.; Gross Tonnage, 9,005; Funnel: Black, Red Band with White Maltese Cross, Black Top.

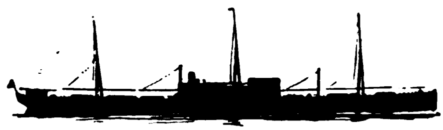
BRITISH INVENTOR. **British Tanker Co.** Length. 430 ft.; Gross Tonnage, 7,101; Funnel: Red, White Band, Black Top: Green Band on White.



ANTONIO LOPEZ. **Compañia Trasatlantica.** Length, 430 ft.; Gross Tonnage, 5,975; Funnel: Black.

MARQUESA. BARONESA. DUQUESA. PRINCESA. CANONESA. **Furness-Houlder.** Length, 430 ft.; Gross Tonnage, 8,972 to 8,286; Funnel: Black, Red Band with White Maltese Cross, Black Top.

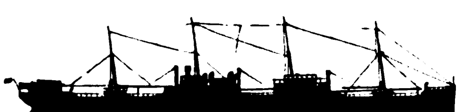
M.S. COLOMBIA. Royal Nederlands Line. Length, 429 ft. 5 ins.: Gross Tonnage, 10,782; Funnel: Black, Two White Bands.



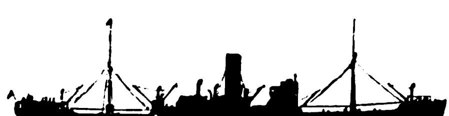
M.S. BUENOS AIRES. M.S. CANADA. M.S. BALBOA. Axel Axelson Johnson. Length, 426 ft. 9 ins.; Gross Tonnage, 5,614 to 5,524.

M.S. IRISBANK. Bank Line. Length, 426 ft. 7 ins.; Gross Tonnage, 5,626; Funnel: Yellow, Black Top.

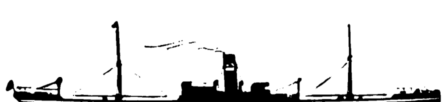
BAYANO. CAMITO. CORONADO. ARIGUANI. CARARE. CAVINA. Elders and Fyffes. Length, 425 ft. 5 ins.; Gross Tonnage, 6,611 to 6,907; Funnel: Buff, Black Top.



M.S. ALSIA. East Asiatic Co. Length, 425 ft. 2 ins.; Gross Tonnage, 5,812.



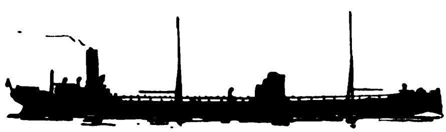
M.S. EURYBATES. Blue Funnel Line. Length, 425 ft.; Gross Tonnage, 6,400; Funnel: Blue, Black Top.



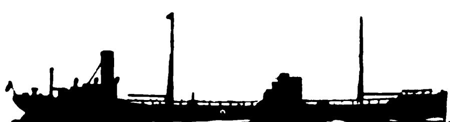
STOCKWELL. Anchor-Brocklebank Line. Length, 425 ft.; Gross Tonnage, 5 643; Funnel: Black, Blue and White Band, Black Top.

CAIRNROSS. Cairn Line. Length, 425 ft.; Gross Tonnage, 5,494; Funnel: Black, Red Band, White Triangle.

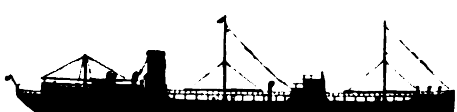
KARAGOLA. KHANDALLA. British India S.N. Co. Length, 425 ft.; Gross Tonnage, 7,053; Funnel: Black, Two White Bands, Black Top.



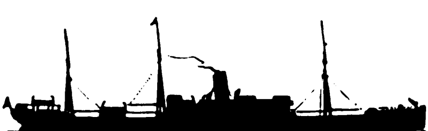
TUSCARORA. Anglo American Oil Co. Length, 425 ft.; Gross Tonnage, 7,106; Funnel: Red, Black Top.



M.S. NARRAGANSETT. Anglo American Oil Co Length, 425 ft.; Gross Tonnage, 6,889; Funnel: Red, Black Top.



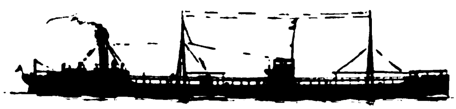
M.S. MEGARA. M.S. MIRZA. Anglo-Saxon Petroleum Co. Length, 423 ft.; Gross Tonnage, 7,992 and 8,004; Funnel; Buff, Black Top.



MANUEL CALVO. Compañia Trasatlantica. Length 421 ft.; Gross Tonnage, 5,617; Funnel: Black.

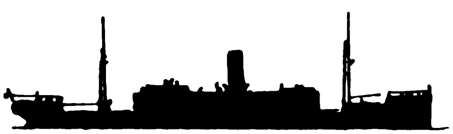
KAROOLA. McIlwraith, McEacharn. Length, 420 ft. 5 ins.; Gross Tonnage, 7,391; Funnel: Red, Black Top.

MARAMA. Union Steamship Co. of N.Z. Length, 420 ft. 3 ins.; Gross Tonnage, 6,497; Funnel: Red, Black Top.



SAN DUNSTANO. SAN EDUARDO. SAN SILVESTRE. SAN TIRSO. SAN VALERIO. SAN ZEFERINO. Eagle Oil Transport Co.
Length, 420 ft. 2 ins.; Gross Tonnage, 6,220;
Funnel: Black, Yellow Band, Black Eagle, Black O on White Band, Yellow Band.
SAN RICARDO. Cia. Navigazione San Ricardo.

ALNMOOR. BLYTHMOOR. CASTLEMOOR. Runciman. Length, 420 ft.;
Gross Tonnage, 6,573:
Funnel: Black, White Band, Blue R.



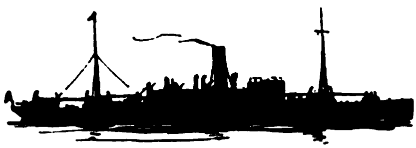
PATUCA. Elders and Fyffes. Length, 417 ft. 2 ins.; Gross Tonnage, 6,103;
Funnel: Buff, Black Top.

LADY DRAKE. LADY HAWKINS. LADY NELSON. Canadian National (West Indies) Steamships. Length, 415 ft.; Gross Tonnage, 7,650;
Funnel: Red, White Band, Blue Top.

LADY RODNEY. LADY SOMERS. Canadian National Steamships. Length, 415 ft.;
Gross Tonnage, 7,650;
Funnel: Red, White Band, Blue Top.

D'ENTRECASTEAUX. FORBIN. Chargeurs Réunis. Length, 417 ft.; Gross Tonnage, 7,291;
DUPLEIX. " " " " " 7,135;
ANGO. " " " 416 ft.; " 7,110;
BOUGAINVILLE. " " " " " 7,110;
Funnel: Yellow, Red Stars on White Band.

MUNARGO. Munson Steamship Co. Length, 415 ft.; Gross Tonnage, 6,484;
Funnel: Blue, White Band, Black Top.

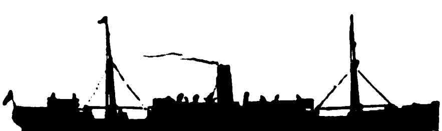


BELVEDERE. Cosulich Line. Length, 412 ft.; Gross Tonnage, 7,420;
Funnel: Red, White Band, Black Top.

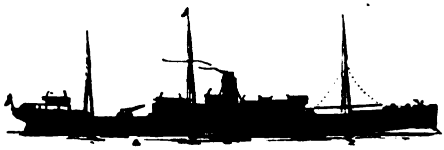
FORT ST. GEORGE. Furness Withy. Length, 411 ft. 3 ins.: Gross Tonnage, 7,785;
Funnel: Black, Red, Thin Black and Red Bands, Black Top.

ERINPURA. British India S.N. Co. Length, 411 ft.; Gross Tonnage, 5,128;
Funnel: Black, Two White Bands, Black Top.

CLAN MACNAB. CLAN MACNAIR. CLAN MACNAUGHTON. CLAN MACNEIL. CLAN MONROE. CLAN MORRISON. CLAN MURDOCH. CLAN MURRAY. Clan Line.
Length, 410 ft. 6 ins.; Gross Tonnage, 6,114;
Funnel: Black, Two Red Bands.



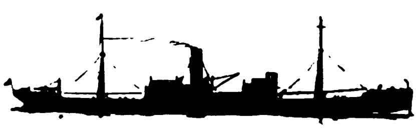
BUENOS AIRES. Compañia Trasatlantica. Length, 410 ft. 6 ins.; Gross Tonnage 5,311;
Funnel: Black.



MONTEVIDEO. Compañia Trasatlantica. Length, 410 ft. 5 ins.; Gross Tonnage, 5,205; Funnel: Black.

ZEALANDIA. Huddart, Parker. Length, 410 ft.; Gross Tonnage, 7,000; Funnel: Yellow.

MEDIA. Anchor-Brocklebank. Length, 410 ft.; Gross Tonnage, 5,437; Funnel: Black, Blue and White Band, Black Top.



OCEAN PRINCE. Furness Withy. Length, 410 ft.; Gross Tonnage, 5,212; Funnel: Black, Red, Thin Black and Red Bands, Black Top.

ELLENGA. British India S.N. Co. Length, 410 ft.; Gross Tonnage, 5,196; Funnel: Black, Two White Bands, Black Top.

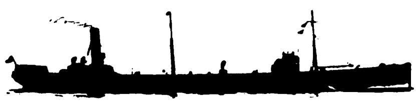
DRAMATIST. Harrison Line. Length, 410 ft.; Gross Tonnage, 5,443; Funnel: Black, Red Band between Two White.

JAMAICA MERCHANT.	Jamaica Direct Fruit Line.	Length, 405 ft.;	Gross Tonnage, 7,381;
JAMAICA PLANTER.	,, ,, ,,	,, 413 ft.;	,, 7,493;
JAMAICA PRODUCER.	,, ,, ,,	,, 413 ft.;	,, 7,490;
JAMAICA SETTLER.	,, ,, ,,	,, 413 ft.;	,, 7,490;

Funnel: Blue, Two White Bands, Black Top.

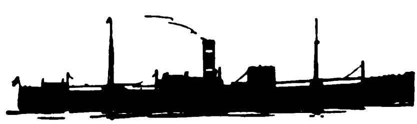
M.S. LOUISIANA. Det Forenede Dampskibs Selskab. Length, 407 ft. 8 ins. ;
Gross Tonnage, 6,613;
Funnel : Flamingo, Red, Black Top.

NEWFOUNDLAND. NOVA SCOTIA. Warren Line (Furness Withy). Length, 405 ft. ;
Gross Tonnage, 6,820 ;
Funnel : Black, Red, Thin Red and Black Bands.



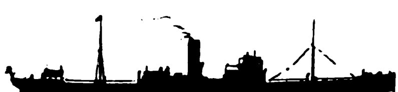
DAGHESTAN. Hindustan Steam Shipping Co. Length, 405 ft. Gross Tonnage, 5,742
Funnel : Black, Two White Bands, Vermilion Between, C in White.

M.S. GLENLUCE. Glen Line. Length, 405 ft. ; Gross Tonnage, 6,755 ;
Funnel : Red, Black Top.

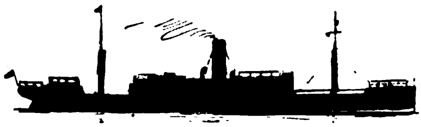


BREDA. Koninklijke Nederlandsche Stoomboot Mij. Length, 402 ft. 6 ins. ;
Gross Tonnage, 6,906 ;
Funnel : Black, Two White Bands.

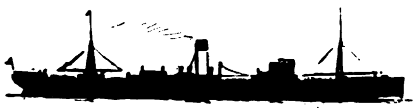
CAIRNESK. AIRNGLEN. Cairn Line. Length, 401 ft. 9 ins. ;
Gross Tonnage 5,007 and 5,019 ;
Funnel : Black, White Diamond on Red Band.



HALIZONES. Houston Line. Length, 400 ft. 8 ins. ; Gross Tonnage, 5,273 ;
Funnel : Red, Two Black Bands, Black Top.



ABINSI. **Elder Dempster.** Length, 400 ft. 5 ins.; Gross Tonnage, 6,365; Funnel: Buff.

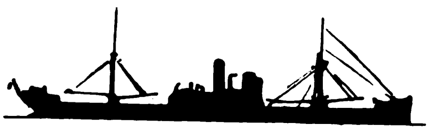


NORWEGIAN. **Leyland Line.** Length, 400 ft. 2 ins.; Gross Tonnage, 6,357; Funnel: Buff, Black Top.

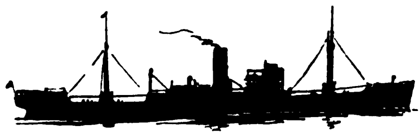
MANISTEE. PATIA. ZENT. **Elders and Fyffes.** Length, 400 ft. 2 ins.; Gross Tonnage, 5,360; Funnel: Buff, Black Top.

EDAVANA. **British India S.N. Co.** Length, 400 ft.; Gross Tonnage, 5,284; Funnel: Black, Two White Bands, Black Top.

CANADIAN VICTOR. **Canadian Government Merchant Marine.** Length, 400 ft.; Gross Tonnage, 5,493; Funnel: Yellow, Black Top.



BADAGRY BARRACOO. BASSA. BATA. BATHURST. BEREBY. BIAFRA. BODNANT. BOUTRY. BOMA. BURUTU. **Elder, Dempster.** Length, 400 ft.; Gross Tonnage, 5,300; Funnel: Buff.

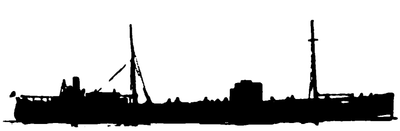


M.S. DOLIUS. M.S. MEDON. Blue Funnel Line. Length, 400 ft.; Gross Tonnage, 5,700; Funnel: Blue, Black Top.

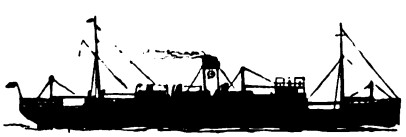
ORANGEMOOR. FERNMOOR. Runciman. Length, 399 ft. 6 ins.; Gross Tonnage, 6,573; Funnel: Black, White Band, Blue R.

CAIRNDHU. CAIRNGOWAN. Cairn Line. Length, 399 ft. 3 ins., and 400 ft.; Gross Tonnage, 5.250, and 5,295; Funnel: Black, Red Band, White Triangle.

BAOULE. DAHOMEY. ADRAR. Chargeurs Réunis. Length, 393 ft. 6 ins.; Gross Tonnage, 5,872 to 5,851: Funnel: Yellow, Red Stars on White Band.



M.S. OLJAREN. Transatlantic S.S. Co. Length, 389 ft.; Gross Tonnage, 5,482; Funnel: Yellow, Black Top.



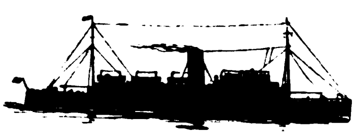
BRITANNIA. SUECIA. Swedish Lloyd. Length, 375 ft., Gross Tonnage, 4,500; Funnel: White; Yellow Star on Blue Disc, Black Top.

ALBAN. Booth Line. Length, 375 ft. 2 ins.; Gross Tonnage, 5,223; Funnel: Black.

M.S. STELLA POLARIS. Bergen Steamship Co. Length, 360 ft.; Gross Tonnage, 5,020; Funnel: Yellow.

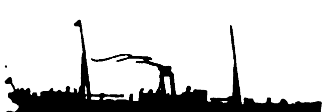
BEN MY CHREE. Isle of Man Steam Packet Co. Length, 355 ft.; Gross Tonnage, 2,586; Funnel: Red, Black Top.

ISLE OF THANET. MAID OF KENT. Southern Railway. Length, 329 ft.; Gross Tonnage, 2,664; Funnel: Buff, Black Top.



CANTERBURY. Southern Railway. Length, 329 ft.; Gross Tonnage, 2,912; Funnel: Buff, Black Top.

SLIEVE BAWN. SLIEVE MORE. London, Midland and Scottish Railway. Length, 300 ft. 2 ins. Gross Tonnage, 1,061; Funnel: Yellow, Black Top.

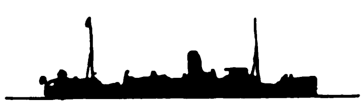


SLIEVE DONARD. London, Midland and Scottish Railway. Length, 300 ft.; Gross Tonnage, 1,116; Funnel: Yellow, Black Top.

SLIEVE GALLION. London, Midland and Scottish Railway.
Length, 299 ft. 5 ins.; Gross Tonnage, 1,071;
Funnel: Yellow, Black Top.

SNOWDON. London, Midland and Scottish Railway. Length, 299 ft. 9 ins.;
Gross Tonnage, 1021;
Funnel: Yellow, Black Top.

PRINCESS ADELAIDE. Canadian Pacific. Length. 290 ft. 5 ins.; Gross Tonnage, 3,061;
Funnel: Yellow, Black Top.



ST. HELIER. ST. JULIEN. ST. PATRICK. Great Western Railway.
Length, 290 ft.; Gross Tonnage, 2,000;
Funnel: Black Top.

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(Pages P3 to P21).

A. = Argentine; B. = Brazil; C. = Chile; C.A. = Commonwealth of Australia; D. = Netherlands; F. = France; G.B. = Great Britain; G. = Greece; Ger. = Germany; I. = Italy; J. = Japan; N. = Norway; R.A.N. = Royal Australian Navy; S. = Spain; Sw. = Sweden; U.S.A. = United States of America.
b. battleship; *b.cr.* battle cruiser; *cr.* cruiser; *a.cr.* armoured cruiser; *air.c.* aircraft carrier; *f.l.* flotilla leader; *l.cr.* light cruiser; *cr.m.l.* cruiser minelayer; *s.cr.* scout cruiser; *s.cl.cr.* second-class cruiser; *tr. cr.* training cruiser; *d.* destroyer; *t.b.d.* torpedo-boat destroyer; *c.d.* coast defence ship.

INDEX TO PLANS OF WARSHIPS (Pages P23 to P104)

A. = Argentine; B. = Brazil; C. = Chile; C.A. = Commonwealth of Australia; D. = Netherlands; F. = France; G.B. = Great Britain; G. = Greece; Ger. = Germany; I. = Italy; J. = Japan; N. = Norway; R.A.N. = Royal Australian Navy; S. = Spain; Sw. = Sweden; U.S.A. = United States of America.

b. battleship; *b.cr.* battle cruiser; *cr.* cruiser; *a.cr.* armoured cruiser; *air.c.* aircraft carrier; *f.l.* flotilla leader; *l.cr.* light cruiser; *cr.m.l.* cruiser mine layer; *s.cr.* scout cruiser; *s.cl.cr.* second-class cruiser; *d.* destroyer; *t.b.d.* torpedo-boat destroyer; *c.d.* coast defence ship.

INDEX TO PROFILES OF MERCHANT SHIPS.

(See Pages P105 to P168.)

INDEX TO PROFILES OF MERCHANT SHIPS.

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